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EXCAVATING ENGINEER

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TO EXCAVATION

About Excavating Projects — By Excavating Men — For Excavating Men — The World Over

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Contents

Notching a Highway in the Side of a Colorado Mountain . . Front Cover
Gordon Construction Company, Denver, uses a Bucyrus-Erie 37-B Shovel with Caterpillar Diesel power on a tough highway building job a few miles southwest of Denver in Bear Creek Canyon. The contract involves moving 250,000 cubic yards of rock.

Frontispiece 216
Pioneering along the International Pan-American Highway which, in a few years, will open the way for through auto traffic as far south as Buenos Aires.

Progress on International Pan-American Highway, by Petrie Mondell . 217
Important highway project which will bring closer together the nations of North and South America involves heavy contracts for road builders.

Highway Beautification by Contract 220
Trees, shrubs and vines included in New Jersey highway biddings.

Built by Nature and Newman, by D. M. Delany 221
Prominent Chicago Contractor, W. J. Newman, rebuilds Wisconsin landscape in developing delightful summer resort at Lake Delton at-the-Dells.

Where the River Shannon Flows 223
Ruston-Bucyrus shovels are mounted on barges to dredge famous Irish river at Killaloe.

Old Times and Old Timers 227
H. H. Hunter Operated this A-C Shovel Back in 1905 227
Old Timer Pode Describes Early Vulcan 227
Steam Shovel Dream of About 1834 227

Editorials 228
The Business Situation 228

American Mining Congress Meets May 7 to 11 229

More Pictures from S.T.I.N. 229

Field Notes 230
Broken Compressor Valve Causes "Chain Knock" 230
Simple Water Flow Measuring Method 230
To Keep Note Book Corners in Good Condition 230

Equipment You Ought to Know About 231
Wisconsin Announces Four Cylinder Heavy Duty Air Cooled Engine 231
New Haiss Leader 231
The Mov-Mor by Davenport 231
Gardner-Denver Vertical Compressors 231
Johnson's Little Titan Scale 231
Easton Announces Two New Dump Bodies . 252
New A-C Oil Tractors 252

Shots from the Firing Line 232
Parker Dam Bids Probably Taken This Month 232
PWA Ruling Modified 232
Fort Peck Dam Diversion Tunnels Awarded 232
Subcontractors' Bids Protected 232
Progress on Public Works Highways to April 14, 1934 232
Rebids on All-American Canal to be Opened May 22nd 232
Yaquina Bay Bridge Letting 232
Sales of Explosives Increased Nine Per Cent in 1933 232
Grand Coulee Dam Bidding June 18th 234
Montreal and Vicinity 234
New York Notes 234
New Jersey Notes 234
Pennsylvania Notes 236
Ohio Notes 236
Michigan Notes 238
Illinois Notes 238
Iowa Notes 238
Minnesota Notes 238
North Dakota Notes 238
South Dakota Notes 238
TVA Notes 242
Tennessee Notes 242
St. Louis and Vicinity 242
River Notes 242
Texas Notes 242
Nevada Notes 244
Arizona Notes 244
Fort Peck Dam Notes 244
San Francisco and Vicinity 244
Oregon Notes 246
Grand Coulee Notes 246

Book Reviews 248

Looking Ahead

These interesting articles will appear in early issues of Excavating Engineer. Watch for them!

Good Mixers.
Great Lakes Coal and Coke Company uses two clamshell-cranes to unload, load and mix coal and coke at Port Newark.

Excavating Belgium's Albert Canal
Involving excavation of some 100,000,000 cubic yards, this is the longest canal project at present under construction in Europe. Part of canal across low country carried between embankments supported by curtain of sheet piling within which cement has been injected into ground to provide a firm and impervious foundation.

The Walker Invades the Coal Fields.
Carey Baxter & Kennedy use walking Diesel dragline successfully on 3,000,000 yard stripping contract in Pennsylvania.

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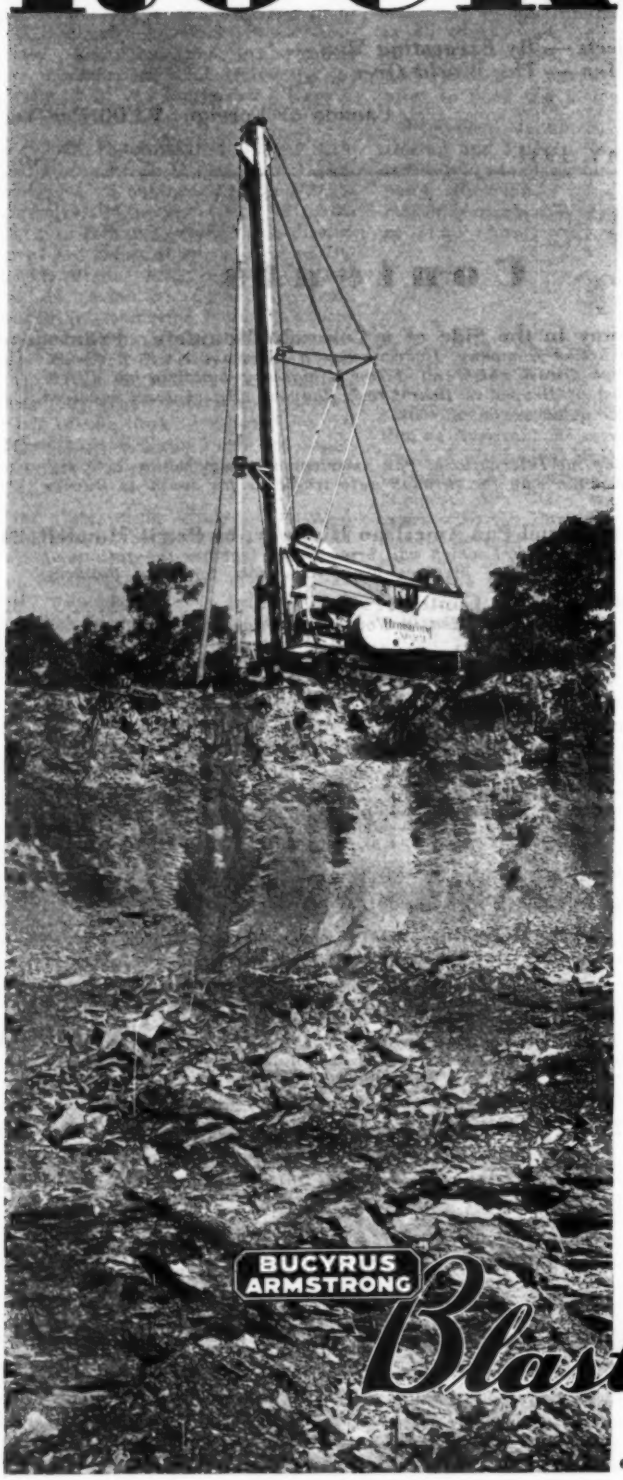
ROCK



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Ask about this new large-hole method for blasting rock and ore.

659

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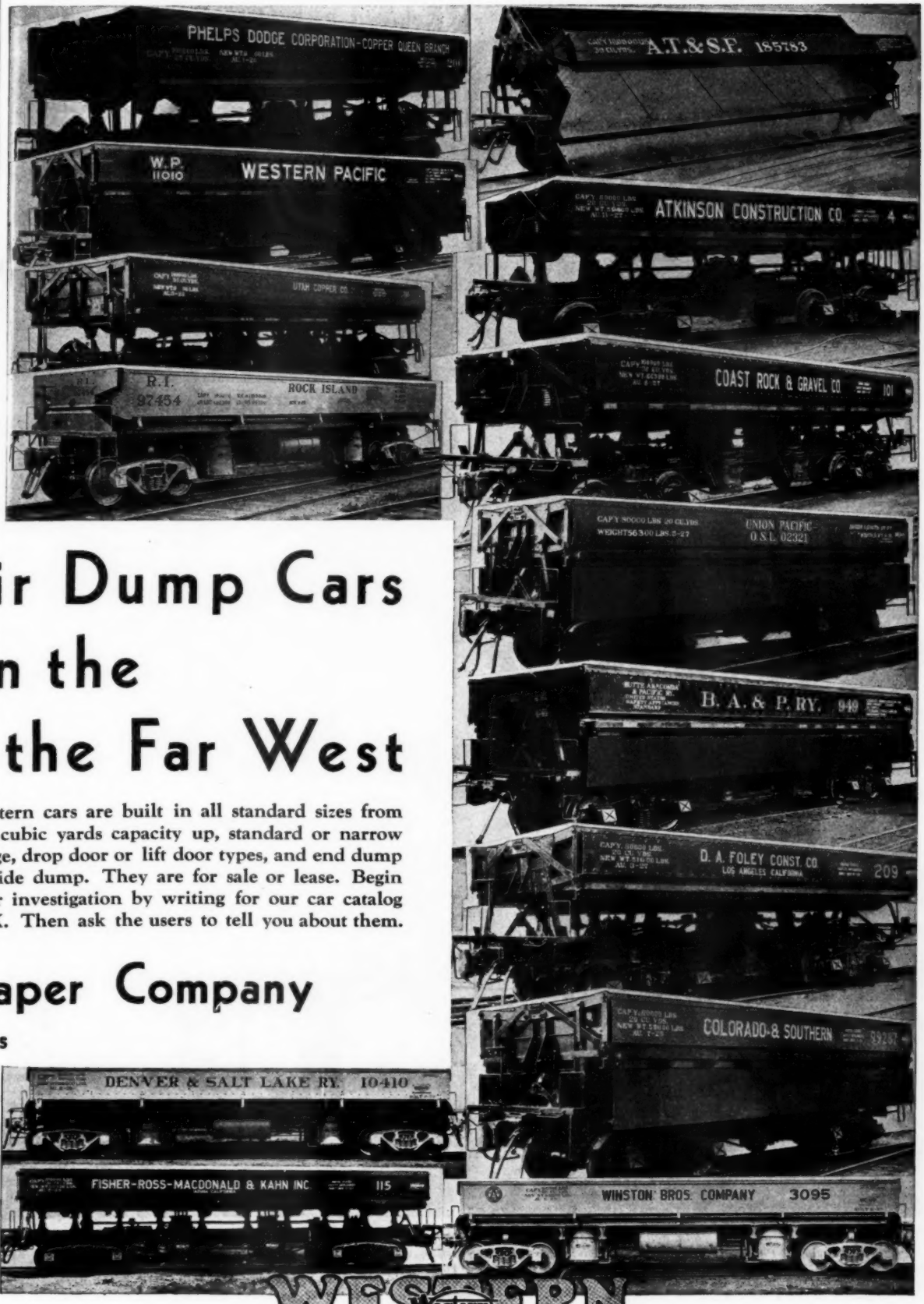
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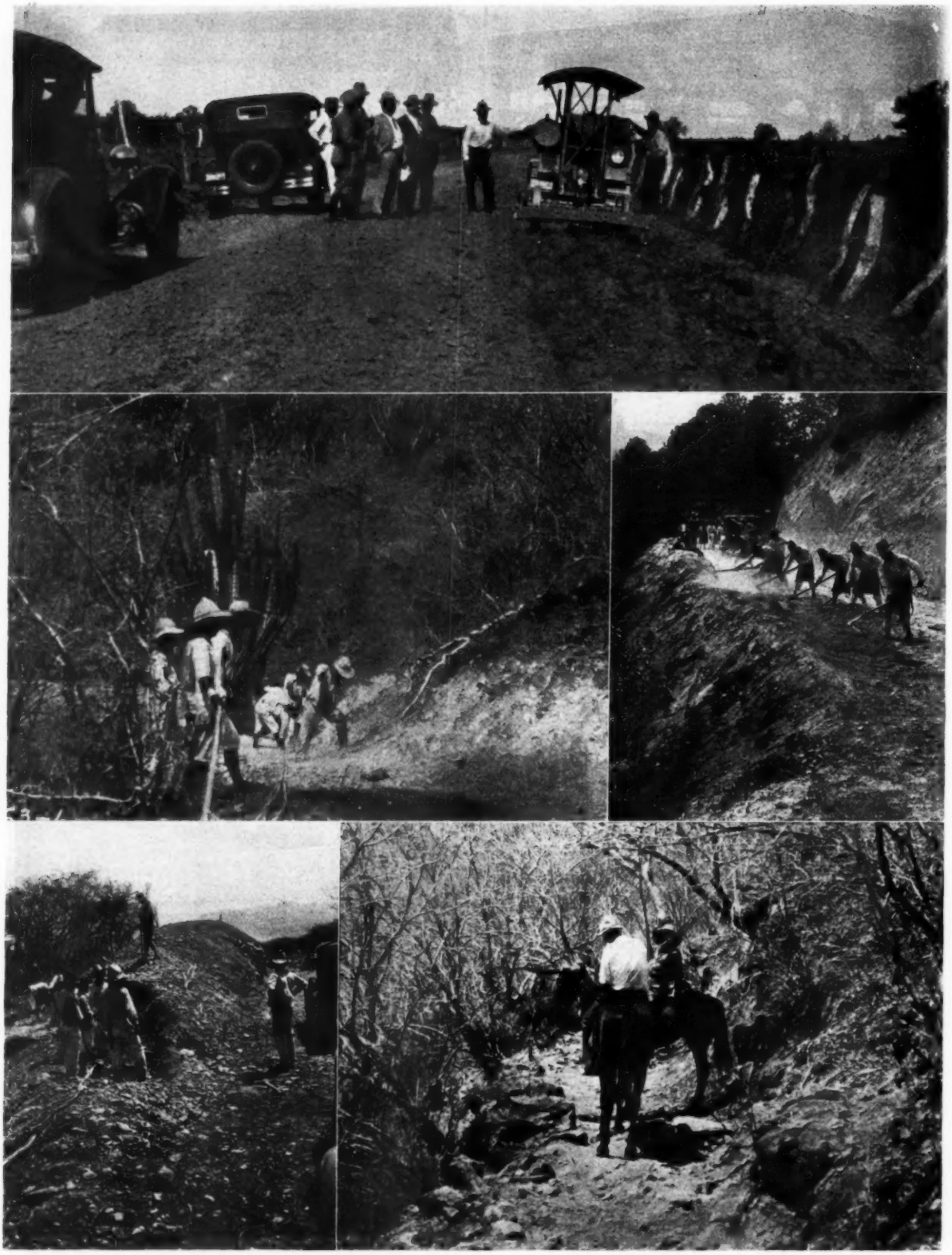

Top: Tractor working road near Culiacan on the route of the International Highway. Left Center: Dragging an International-Pacific-Highway-Expedition car up a steep grade with man-power and ropes. Right Center: Rough work on the Barrancas, but it's easy compared to the rock on the bottom. Heavy machinery for this work could not be moved into the area. Later, when the first roadbeds are in, work can be handled with machinery. Lower left: Peons hard at work on the Mexican sections. Lower right: Reconnoitering for a possible trail over the Barrancas near Tepic, Mexico.

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Progress on International Pan-American Highway

Much work for road builders involved in building of improved highway to join nations of North and South America.

By PETRIE MONDELL

THE SUCCESS of the Mexican Government in pushing through a road over the high Barrancas which have from earliest time formed a barrier between Mexico City and the Mexican west coast, and the announcement of President Roosevelt that the United States is ready to appropriate $600,000 to assist Latin American nations to survey and allocate highways in the few remaining uncompleted gaps in the Central American section of the International Pan-American Highway, now assure a complete passable highway from the United States to the Panama Canal Zone within a few years. Two years has been stated to be the time component. This may be optimistic, but in that time an automobile passage should be possible, with due care, and shortly afterward a road that could be rated as "good" will be open.

The interest of the United States in the highway has been based on three important considerations. First is the commercial stabilization of Central America —one of the real incidental purposes of the proposed Nicaraguan Canal, by the way. However, since the Nicaraguan Canal could not even be started in less than four years, nor completed for use in fifteen years, and since the International Highway can be operating within three years, the objectives of the United States can be more rapidly attained by immediate support to the highway, which it has now accorded.

The second consideration is that of development of a community of interest in Pan-America. Tourist monies largely spent hitherto in Europe with little thanks to the United States and scarcely any adequate national return, may, if directed to Latin America, become a real national asset, since Americans are the largest purchasers of tourist attractions in the world.

The third consideration is military contribution to a possible necessary defence of the Panama Canal, without, however, violations of neutrality, if there happens to be any Central American neutrals when peril of highway interruption threatens. The highway will be too profitable to all the republics to permit traffic to be interrupted. Then, too, any military defence of the Canal would involve United States expenditures all along the Highway route with welcomed revenue for the republics.

Road Open to San Salvador

The Highway is now actually passable for automobiles as far as San Salvador, and in some sections to the south.

From La Horcones, 1,405 miles from Mexico City, to Ayutla on the border line of Chiapas and Guatemala, is announced as being travelable now for automobiles; and from La Horcones south to Panama, with the exception of the road from Panama

A staunch supporter of the International Highway, Colonel Filiberto Gomez was photographed at the controls of a tractor when on an inspection tour of Lower California highways. It is reported that Colonel Gomez, when the governor of the State of Mexico, contributed bonuses from his own funds to the road workmen to urge them to speed their efforts.

to Sona, a distance of 200 miles, a short space between Remedios and David in the State of Panama (Republic of Panama), another small strip between San Jose and San Ramon and a third strip between Las Canas and La Cruz in Nicaragua, the highway is marked passable for most of the way.

But from San Jose in the Republic of Costa Rica, south to the little town of Volcan, a distance of 197 miles, the information indicates no passable road, and just what is necessary to cover this portion of the Highway has been until recently a mystery. However, the borings and topographical work of the U. S. Army Engineers in Nicaragua for the Nicaraguan Isthmian Canal, have lifted the veil sufficiently to indicate that materials will be available nearby for the work, and that the elevations will be much more moderate than those on many other sections of the Highway.

Considerable materials of construction are available in Nicaragua. Sufficient rock is available. It is predominantly shale with some beds of sandstone and limestone. In addition, there is a large deposit of andesite on the north side of the Rio Grande Valley near Buen Retiro. This rock will make an excellent aggregate and can likewise be quarried in sizes suitable for breakwater construction. Owing to a lack of sand, it seems probable that crushed sandstone and rock screenings will have to be substituted for sand in concrete construction.

Pioneers cutting out a jungle path.

Mexico's Magnificent Work

The road through the Barrancas undoubtedly will stand as one of the road building epics. The peons fought their way through solid rock in many places. Not even oxen had ever been through some of the primeval jungle of this barrier which has kept Mexico City from overland direct communication with the west coast.

The Barrancas were first penetrated by United States Engineers under the command of E. E. East, the chief engineer of the Automobile Club of Southern California. He took his Ford cars through with block and tackle and man-power.

Colonel Filiberto Gomez, the Governor of the State of Mexico when the Barranca road was started, used to use money from his own pockets to provide bon-

Construction work on the International Highway is shown in this view taken in the Barrancas, the Mexican State mountain section.

uses for the road workers as an urge to speed in the work. In fact, all Mexican officials, from the Presidents down, who have been associated with the International Highway, have given a co-operation which is eloquent of the new era of friendship between the United States and Mexico.

The Federal Road Commission of Mexico budgeted for the years 1930 to 1934 inclusive, a minimum of 80,000,000 pesos, 9 million to maintenance and 71 million to construct trunk roads. With state and municipal (corresponding to United States counties) expenditures ran at least 20 million pesos.

Here the International Highway crosses a banana plantation. The view shows the initial path which was cut through prior to putting in the roadbed.

The new budget, when announced, will undoubtedly run far ahead of the one expiring. Mexico is making great efforts to attract United States tourists, having seen the value of their expenditures to France. The Republic is encouraged in her efforts in this direction because of what is now considered a trend toward Latin America, with the active support of the administration at Washington.

Surveyors find mighty rough going over the first cut made in the Barranca mountain section.

Passable Highway Grade First Step in Construction

The stage construction method has been adopted as a principle. Grading is done, and the drainage structures put in. Surfacing with rock or gravel and asphalt is the general practice on first class roads, but as the traffic warrants, paving will go on.

Activities of commercial interests with an inordinate selfishness, and money lenders are discouraged, despite a heavy pressure brought to bear. Loans could easily be floated, but Mexico prefers to pay for her roads out of an income derived from taxes on gasoline, the Federal tax for the Federal Highway Commission having been fixed at the start as 4 centavos per litre.

Funds have already been budgeted for the almost two thousand miles of highway between Guadalajara and the southern border.

Reference to loans above does not mean that they shall not be asked, if conditions warrant, and they look profitable, but they will not be made under duress. Nor does reference to commercial interests signify those United States concerns with which Mexico has long had dealings, but it does mean interests which have been attempting to foist costly projects on Mexico in districts where traffic doesn't warrant them.

Cost of bridges over major streams on International Pan-American Highway sections (bridges yet to be built) is estimated at 5,472,500 pesos.

The State of Sonora has about 300 miles to be graded and fitted with minor drainage structures;

Mexican maintenance force at work on International Pacific Highway between Nogales, Arizona, and Magdalena, Mexico.

Sinaloa has 350 miles to be graded and fitted with minor drainage structures, and Nayarit has 185 miles, Jalisco 160 miles, Michoacan 236 miles, and the State of Mexico 64 miles. There are also, in all the above states approximately 20,000 linear feet of steel truss bridges to go in, with the appropriate bridge heads and excavation for them.

From Puebla through Guatemala to San Salvador, engineers' estimates indicate that $12,422,000 will be required to bring the now passable roads to modern width, alignment and gradient, and surfacing with local crushed rock or gravel, 1,133 miles in all. With the Washington government interested in the early com-

Engineering cars had to make their way through the desert jungles with the aid of a strong pull from up front and a big push from behind.

pletion of the work, it is felt some way will be found to finance the work. It would not surprise anyone familiar with the status of things to hear of an early announcement on this angle.

Highway to Reach Buenos Aires Within Five Years

Solid rock surface and sub-surface for many miles will have to be blasted for the roadway. In fact, it has already been made passable in some sections by the necessary blasting of the first engineering expedition.

To avoid confusion, it should be said that the International Highway is the same as the Pan-American Highway south of Mexico City. It is strictly the "International Pacific Highway" from Los Angeles to Nogales, to Mazatlan, to Tepic, over the Barrancas to Guadalajara, and thence to Mexico City.

It is scarcely necessary to repeat here that this International Pan-American Highway has Buenos Aires as its southern terminus. It will run through 17 nations. Present estimates show that travel over the whole route will be moving, possibly, within five years, a reduction of two years in previous estimates, largely because of increased speed promises at the late Pan-American Conference in Montevideo, where all the nations endorsed it. Four hundred two papers in South, Central and North America have adopted the Highway as an editorial objective.

An interesting job on many hundreds of miles of the route is the removal of deep transverse corrugations caused by the hundreds of years of travel by pack mules. Hundred of miles of primordial jungle have been cut through with machetes, and the path made for creation of a road bed.

One reason why construction may be forced speedily in Mexico, is that a great tourist circle can be created, entering Mexico at Laredo, proceeding south to Mexico City, then over the Barrancas

This view gives some idea of the difficulties encountered in the Barranca mountain section which has long stood the barrier to communication between Mexico City and the West Coast.

to Mazatlan and up the coast or western route to Nogales to reenter the United States, or vice versa.

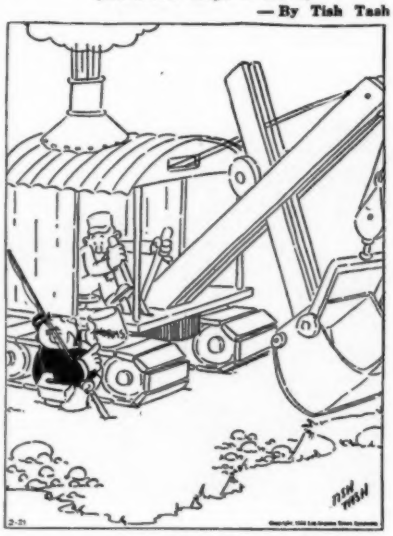
Highway Beautification by Contract

SOMEWHAT unusual were the announcements sent out by the New Jersey Highway Commission for the letting April 16th. One item called for 848 cubic yards of borrow, 134 trees, 1799 shrubs and 187 vines of various species. Another started out with 4,322 yards of borrow, 549 square yards of macadam and 1764 square yards broken stone or slag walk . . . and then comes 177 trees, 1,543 shrubs and 1350 vines.

The highway contractor will have to get a line on new sources of materials and establish some new cost records. But New Jersey will get highway beautification at a reasonable price . . . will put men to work on jobs where they'll do a real day's work at a fair day's pay. There will be just as much employment for the money available and the public, who must pay the bill, will get a lot more miles of highway beautification for their money.

Congratulations New Jersey!

Van Boring
(He Never Says a Word)
— By Tish Tash



COURTESY THE MILWAUKEE JOURNAL

Built by Nature and Newman

How modern engineering built an ideal resort.

By D. M. DELANY

ONE of the most pretentious engineering jobs ever connected with a summer resort is rapidly nearing completion at Lake Delton at-the-Dells in Wisconsin. Seven arduous years against all manner of obstacles were spent in building this resort which included the building of a lake, eighteen-hole golf course, an airport and all the other essentials of a modern vacationland.

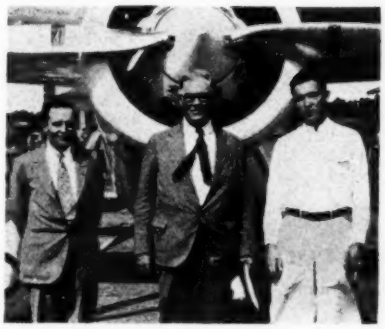
Back in 1926, W. J. Newman, prominent Chicago contractor and head of the firm bearing that name, visioned the possibilities of a large resort in the heart of the world-famous scenery of the Wisconsin Dells. The country was rich in natural beauty but only rivers and creeks were available. Mr. Newman wanted a lake for his resort so he set out to build one.

This was the first step in the

Cleaning channel with Bucyrus-Erie dragline.

program. Mr. Newman purchased 2600 acres of farm lands and steam shovels, tractors, and trucks. Hundreds of men went to work to hew out a lake where corn, wheat and other farm products formerly were raised. Under the able direction of R. M. Hines, general manager and an engineer on Mr. Newman's staff, the terrain soon took on a new outline.

Numerous obstacles such as spring freshets which engulfed the steam shovels and other equipment beset the crews. But the Chicago contractor persisted in his desire for a lake. As a result



The builders of Lake Delton—left to right: R. M. Hines, general manager; W. J. Newman who conceived the idea; W. J. Newman, Jr.

of his tenacity Mr. Newman today has his lake, a beautiful body of water with a shoreline of six and one-half miles; a lake that is spring-fed and has numerous sandy beaches fringed with pine trees.

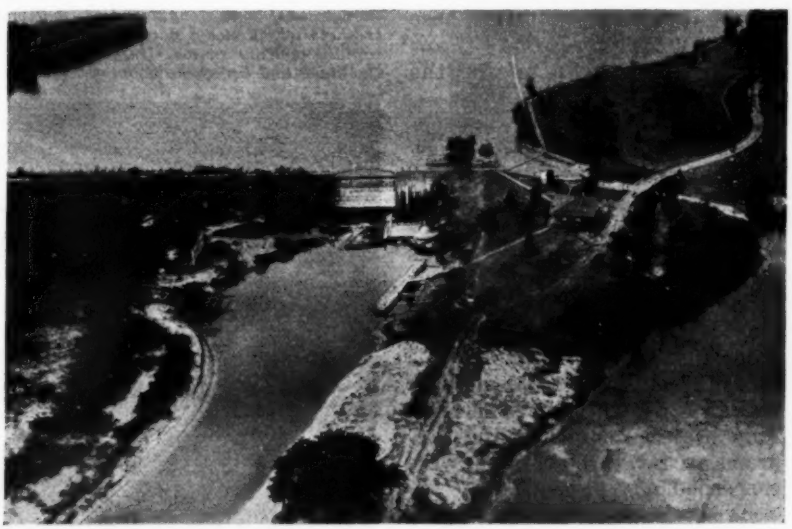
The first step in the gigantic program was finished. But what good is a lake if it isn't full of fish? Mr. Newman reasoned. As a result the steam shovels went to work again and two large fish hatcheries were built. These hatcheries keep the lake plentifully supplied with all kinds of game fish.

Now that he had a lake and the fish Mr. Newman set about building a modern hotel equipped with all the advantages of a city hostelry. In addition he erected several cottages and today his resort can take care of 500 guests.

With the completion of the hotel the steam shovels and tractors went to work again, this time on the development of an eighteen-hole golf course. Trees were blasted and fairways carved through the woods. The picturesque ravines of the Dells region added natural hazards to the course. Water holes were built and high rolling greens hemmed in by pine and oak trees erected. Natural beauty coupled with engineering skill have made this course a mecca for golfers and now it is the scene of the annual Dells Championship, one of the most popular tournaments in the middlewest.

Lake Delton rapidly was shaping up as a resort. With his vision again at work the Chicago contractor foresaw the coming mode of transportation—aviation. To be up-to-date Lake Delton should have an airport. Construction crews were called out again and went to work on a farm land across the highway from the hotel.

As a result, the resort that was



The completed dam shown from the air. The dam backs up the water to form Lake Delton.

Partially erected dam.

five hours away from Chicago by train or auto now is less than an hour away by airplane. A complete airplane service station is maintained, daily sight-seeing trips are made, instruction in flying is offered, and planes are available for charter trips to any place in the country.

Lake Delton now offered excellent bathing, boating, fishing, golf and flying. But the resort was far from complete in Mr. Newman's estimation. Work was begun on a riding academy and bridle paths were built through the pine-scented woods. Today the equestrian can ride over miles of private trails far from the perils of traffic.

The riding academy project was followed up with the construction of tennis courts. These were built within a stone's throw of the Dell View hotel for the convenience of guests.

Then some trout fishing enthusiasts came to the Dell View hotel. They expressed their delight in this type of fishing. Mr. Newman again called out his construction crews and work was started on the building of a trout lake. Another spring-fed lake cropped up on the Lake Delton properties and today this lake is full of trout and trout only, a paradise for the fly fisherman. This project completed the program as far as fishermen were concerned.

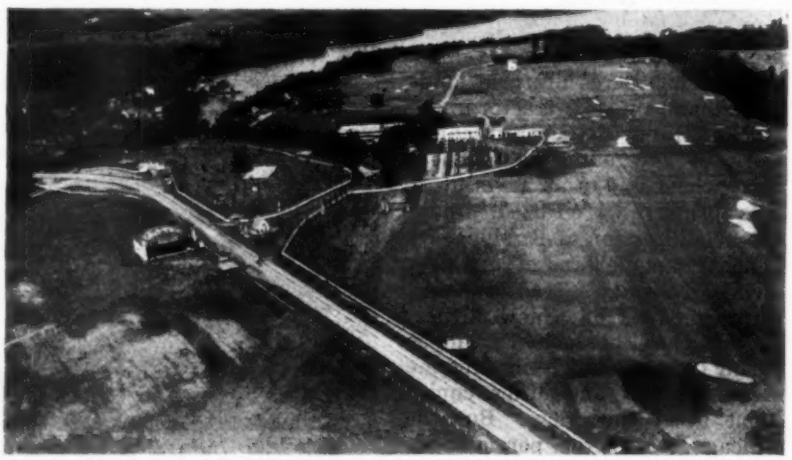
Everyone was having a good time at Mr. Newman's resort by this time. But then parents often find it necessary to take children with them on their vacations. Mr. Newman had provided many activities for adults. Next he decided to do something for the children. Work was started on a playground. It was equipped with slides, teeters and all the other devices that delight youngsters. A supervisor was placed in charge to arrange games and care for the young tots. Now the parents can "check" their children at the playground while they golf, swim or otherwise amuse themselves, knowing their children are safe.

Encountering difficulties. The steam shovel has been engulfed by spring freshets which swept down upon it from rapidly melting snows. Only the top of the stack and tip of the boom are visible.

With all these activities in full swing there now was practically nothing more to do but improve the grounds. Nature was good to this region and endowed it with beauty but there were spots here and there where a tree would improve the picture. This winter the crews were called out again and full-grown pine trees were transported and planted in places nature had missed.

When the vacation season rolls around this year tourists will find the advantages of seven years of engineering skill working in harmony with Mother Nature to provide the ideal resort.

Lake Delton truly is a project "Built by Nature and Newman."

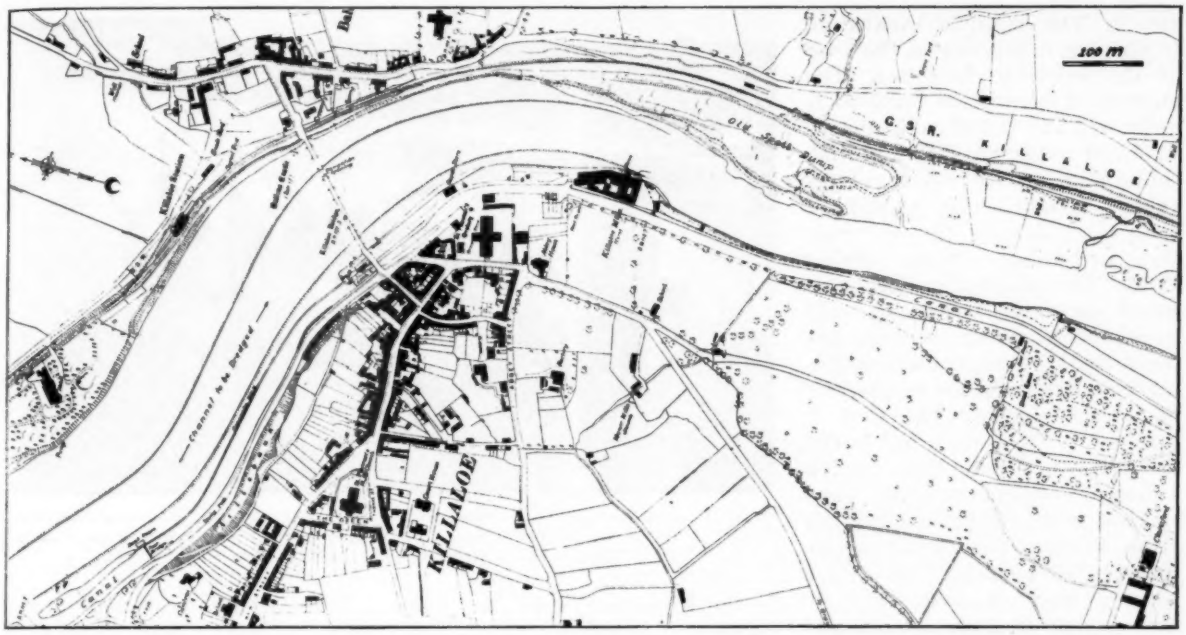


An air view of the finished resort, depicting seven years of engineering work.

"IN 1933 the average factory price of the new cars sold was only $630 and of trucks it was only $645. More cars are sold to buyers with incomes of less than $1,400 a year than are sold to buyers with incomes above $7,000 a year. The gasoline taxes are not levied upon the big oil companies —which many would have us believe. One has only to glance at the price signs on any filling station to know better than that.

The bulk of the gasoline taxes are paid by men and women driving cars that have a value of not over $200."

. . . Alfred P. Sloan, Jr., President of General Motors in an Interview by Samuel Crowther.



Scale drawing of the Killaloe district of the River Shannon where the flood control project described on these pages was carried out.

Where the River Shannon Flows

Unique dredging project in Ireland successfully handled with barge-mounted shovels.

AT KILLALOE, a delightful spot on the River Shannon at the outlet end of Loch Derg, the Electricity Supply Board of the Irish Free State is deepening the Shannon and removing portion of an old masonry weir, so as to improve the rate of discharge from the Loch at low storage levels and to give better regulation of storage under conditions of heavy inflow to Loch Derg.

Previous to the construction of the Shannon Power Development the level of Loch Derg was controlled within limits by the old weir at Killaloe. When the power plant was constructed, between the years 1925 and 1929, a new weir was constructed about three miles downstream from Killaloe. The water level on this three mile section was raised to the level of the Loch and portion of the River flow was diverted into a Head Race Canal, of about eight miles long, to the Power Station.

The River at Killaloe is about 157.00 metres (515 feet) wide and about 2.6 to 3.6 metres (8′6″ to 11′9″) deep at high water level. At low rates of discharge from the Loch the section of the River at Killaloe does not present any great obstruction to flow and, under these conditions, the loss of head at the Power Station, resulting from this obstruction, is inappreciable. During the early stages of the Power Development it was not economic to improve discharge facilities at Killaloe, but as the demand for power increased from year to year, the rate of draw off from the Loch increased, and it became economical and necessary to carry out dredging.

The deepening consists in cutting a channel in the bed of the River on the location shown in the cut at the top of this page.

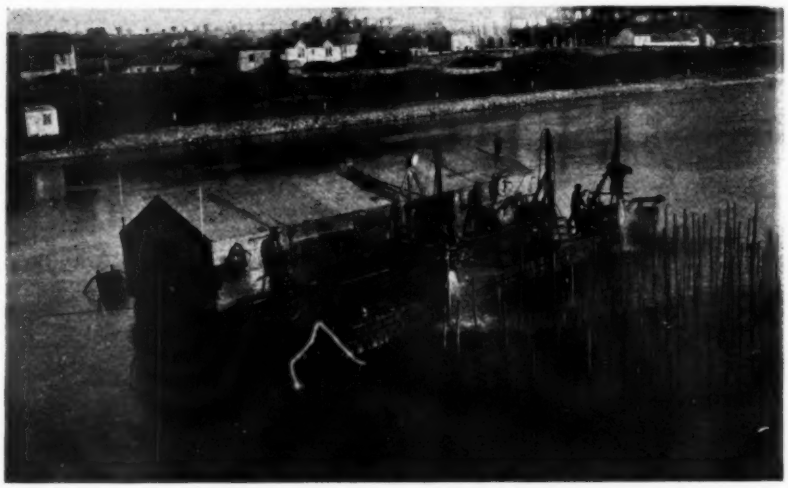
Erecting the 32-B on the pontoon.

This channel is 1250 metres (4,100 feet) long and 60 metres (197 feet) wide. The invert of the channel is 5.55 metres (18′0″) below high water level and the maximum depth of excavation is about 2.95 metres

(9'6"). The depth of excavation is variable, depending on the level of the existing river bed. The amount of excavation involved is estimated at 111,500 cubic metres (145,900 cubic yards), material, containing 10,000 cubic metres (about 13,000 cubic yards) of rock, exclusive of the old weir and preliminary work during 1932. The material to be excavated consists mostly of stiff boulder clay, certain sections are comprised of loose gravel containing boulders up to three-quarters of a cubic metre. The rock is confined to two areas and is Old Devonian Red Sandstone having a more or less uneven surface and covered with overburden varying from 30 cms. (one foot) to one metre (3'-3") thick. The portion of the weir removed was 70 metres (230 ft. approx.) long and the section of this weir is shown in the diagram on this page.

Pontoon Mounted Shovels Used for Dredging

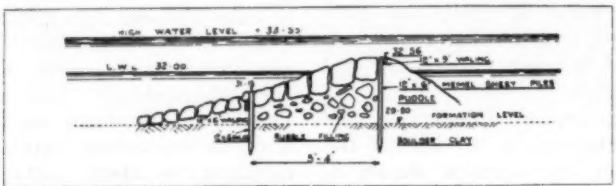
Prior to final arrangement as to the simplest form of channel which would avoid heavy rock excavation and still give reasonable efficiency, the Board's maintenance plant was used in removing the weir and clearing out a number of high spots on the River bed. This plant consisted of a Ruston-Bucyrus 32-B Excavator, mounted on a steel pontoon. This machine was fitted with lengthened dipper arm enabling it to dig about 4 metres (13 feet) below water level. The plant was held in position by four mooring lines, two forward, and two aft, spread at approximately, an angle of 45°. Each mooring line was attached to the pontoon through a shock absorber, or strong spring, and was lead to a return block, about mid length of the mooring rope, and back to a hand winch, fixed on the deck of the pontoon. The return block was fixed to anything up to 200 feet, wire rope attached to anchors set



Drilling outfit used for rock work in the Shannon at Killaloe. Four Ingersoll-Rand drifter drills put down the holes. Two Ingersol-Rand compressors housed on the barge supply air. Poles mark the holes for the loading crew.

in the River bed or on the River bank. No spuds were used. Owing to difficulty in obtaining anchorages, to prevent loss in time from frequent changing of anchors and for ease in working, each mooring unit was 183 metres (600 ft.) long and gave a forward movement of about 400 ft. from a center position without changing anchorages. Certain difficulties arose in obtaining from experience the correct setting and in training the driver, so as not to over excavate and at the same time not leave high spots in the bed of the new cut. This over digging has finally been held to 10 cms. (4" av.) and it does not appear safe to attempt a lower tolerance in this material, as any decrease leads to loss in time in removing high spots.

In 1932 the 32-B Excavator removed 54,755 tons, or 27,500 cubic metres (35,900 cubic yards) in 1,654 machine hours. The maximum output during this period of six and a half months was thirty-five tons in thirty minutes. The fuel consumption was 2,774 gallons for the 1,654 hours, or 1.7 gallons per hour. Six sets of dipper teeth were worn out.



Cross section of the weir.

The machine and plant proved so satisfactory that it was decided early in 1933 to carry out the entire job on this system. A second machine was ordered in the Spring of 1933. This Ruston-Bucyrus 43-B Diesel was fitted with lengthened dipper arm and ⅞ cubic yard bucket, thus allowing the machine to dig 5.55 metres (18 feet) below water level. The machine is mounted on a steel pontoon similar to the 32-B excavator.

As the machine was somewhat late in being ordered and delivery was held up by dock strikes, it was decided to proceed with the excavation of the main channel with the 32-B equipment to such depths as it could reach and to put the 43-B equipment into commission as soon as available. The 32-B excavator commenced work in April 1933 and finished all it could reach in mid August. The 43-B Excavator commenced work in mid August. During the period April to the end of December 1933, approximately 55,000 cbm. (72,000 cubic yards) of material had been excavated. During this period of work, i.e., the 32-B from April to August and the 43-B from August to December, the machines worked practically 121 hours per week, except for short periods of shut down arising from storms, or bad weather, when it was not practicable to dispose of the spoil out in the Loch.

During the period 26th August 1933 to 30th December 1933, the 43-B removed 57,200 tons. The engine running time for this period was 1,766 hours, the Diesel oil consumption was 4,831 gallons.

Stone Weir Removed

The weir section shown in one of the illustrations was built in the good old days when time was unimportant, labor cheap and skilled stoneworkers plentiful. The weir was constructed between two rows of timber sheet piling with a stone apron at the toe. The crest and downstream face was built in hammer dressed limestone with good close jointing. The body of the weir was rubble stone hand packed. Most of the stones on the crest were 1.8 metres (6 feet) long x 0.9 metres (3 feet) wide x 0.45 metres (1'-6") deep, the remainder of the facing stones were about half this size on plan.

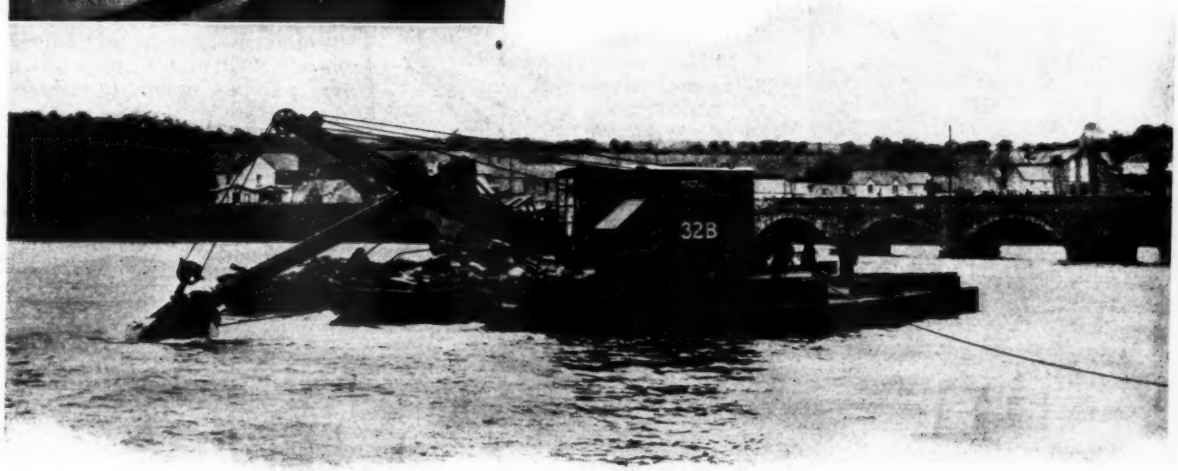
Before the 32-B commenced operations on the removal of the weir, a number of the stones were drilled underwater by a diver, and blasted, but as soon as the excavation had got a working face, drilling was abandoned and the stones split by putting charges in the joints that had opened up and by plaster blasting. In this way the stones were shattered sufficiently to enable the machine to handle them. As the weir was not far from houses the charges were of necessity small and most of the onus of difficulties put on the machine.

Rock Removal Problems

The rock is in two sections, each about 3,000 square meters in area. No attempt was made to remove the overburden, as this appeared too slow and expensive. Drilling and blasting operations are carried out from a floating pontoon with Ingersoll-Rand N-75 drills operated from wagon mountings. No divers are employed, but the explosive is placed into the holes through pipes which rise from the bottom of each hole to above water level. The pontoon houses two Ingersoll-Rand compressors of about 450 cubic feet capacity free air each, at 100 lbs. pressure, blacksmith's shop, forge and drill sharpener. Electric power is supplied to the pontoon from a convenient 10 KV line and transformer supplying the village of Killaloe. The drilling pontoon is moored by two lines forward and two aft and no spuds are used. Owing to the proximity of houses only one hole can be blasted at a time.

Drill operator at work.

About 200 holes, varying in depth between 1 and 3 metres (3.3 to 10 feet), can be drilled by four drills in twenty-two hours. The actual time required to drill a hole is about fifteen to twenty minutes, the balance of the time is lost in shifting position, waiting for one or two drills to finish, releasing an occasional stuck



Two views of the barge mounted 32-B shovel with the bridge between Killaloe and Ballina in the background.

steel, changing of drills steels, etc. The holes are drilled 30 cms. (12 inches) below the invert of the finished channel.

Smooth running of drilling and blasting of this rock were only arrived at after two months work, but the results now appear satisfactory.

During extremely low water conditions, in November, 1933, the 32-B was employed to excavate a portion of the shattered rock with a view to determine if the rock was sufficiently shattered for excavation and to see if the drilling tolerance was sufficient. The results both of dredging and of drilling and blasting appeared satisfactory, and it was decided to continue with the methods in operation.

Completing erection ready for test.

Barges Dispose of Soil

The material excavated from the channel is dumped by the dredgers on to barges as a deck load, in order to facilitate unloading. These barges are capable of carrying 30 to 40 tons deck load, and are towed about two miles and the spoil dumped into a deep portion of the loch. The dumping is carried out by hand. Towing is done by a 40 B.H.P. semi-diesel engine driven tug.

For night work the dredgers are lighted up, either by electric lighting sets of ½ to 1 KW output, or by two search lights, located on the river bank. The search lights are supplied from the low tension mains supplying the drilling outfit. The dumping ground is lighted by a ½ KW petrol-driven electric lighting set, located on a small timber pontoon. The drilling pontoon and outfit is lighter from the lines supplying power to the motors of the compressor.

The entire plant on the job consists of:—One 43-B and one 32-B Diesel-driven Ruston-Bucyrus excavators—this latter machine is to be replaced by a 37-B excavator in 1934, so as to complete the work by the end of October 1934. Six forty-ton barges, obtained second-hand from the various navigation concerns on the Shannon. One 40 B.H.P. Diesel-driven tug, one 30-foot gasoline-driven launch and four tow boats. The rock breaking plant consists of one 58 ft. long x 25 ft. wide, pontoon, housing two electrically-driven compressors, each having an output of 450 cubic ft. free air at 100 lbs. per sq. inch pressure, air receiver, blacksmith shop, Leyner drill sharpener. Drilling is carried out by 4 Ingersoll-Rand N-75 drifter drills. A small timber pontoon with blasting gang follows up the drilling and charges the holes through tubes. Electrical power at the site is free to the Department, at the low tension side of the transformer.

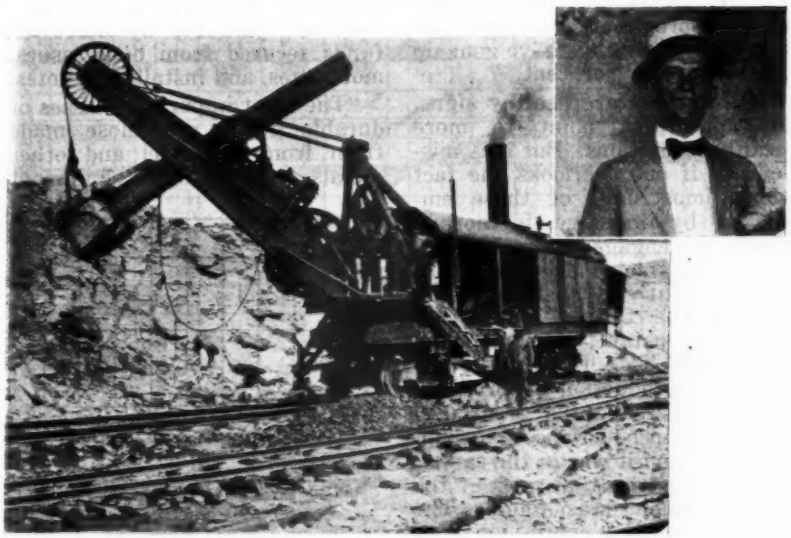
The work is carried out by locally employed direct labor under the supervision of the Boards' Civil Engineering Department, and so far, has proved economical. It would appear from the progress up to the end of December, that the total excavation of 111,5000 cubic metres, (145,842 cubic yards,) will be completed by the end of October 1934. Normally all dredging and drilling plants operate for 121 hours per week, except when held up from stormy weather and flood conditions.

The staff employed on the job is indebted to Messrs. Ruston-Bucyrus for the excavating plant, its reliability and their service and advice in running of the plant, also to Messrs. Ingersoll-Rand and other firms for their plant and help and advice in operating this plant, so far, successfully.

Extra long handles permit this barge mounted Ruston-Bucyrus 43-B shovel to dredge 18 feet below water level.

Old Times and Old Timers

H. H. Hunter Operated this A-C Shovel Back in 1905



FROM Old Timer H. H. Hunter of Harrisburg, Pennsylvania comes the accompanying picture of an old Allis-Chalmers railroad-type shovel which he operated for the Chicago Portland Cement Company at Oglesby, Illinois in 1905. D. D. Drum was in charge of this operation.

Probably few of our readers know that Allis-Chalmers, famous for their tractors, pumps, compressors, crushers, and other heavy machinery, at one time built steam shovels. They entered this field in 1905 and built ten 40-ton and six 70-ton machines in the following three years. The shovel line was discontinued in 1908. Particularly interesting are the series of large sheaves which carried the wire hoist cable back to the drum. Also note the deep dredge-type boom and the heavy dipper sticks.

Mr. Hunter, who is shown in the small illustration, would also like to get the present address of Jack Christan, J. L. Titus and Jim Bench. All of these men were at one time members of the Pittsburg local No. 6 of the International Shovel and Dredgemen. Will any of our readers who know these men please drop us a line as to their present whereabouts.

Thank you, Mr. Hunter. We are sure some of our readers will be able to put you in touch with your friends.

Old Timer Pode Describes Early Vulcan

OLD TIMER Steve Pode, Coreys, N. Y., isn't active in the excavating field any more, but he keeps up with the times—new and old—by reading. He adds to the information about earlier shovels:

"Your Old Timers column sponsored by N. C. McGinnis is very interesting. I remember Owen McGinnis' place where the shovel men used to visit. There gathered such men as "Skinny" Martin, Con Yonkers, Case Sweet, Bill Carigan, J. Harvey, "Kid" McCarty, Joe Glenn, Tom Cunningham, George Baker, Johnny Maher and others. I've lost track of them all. That was about 1899. Sorry I have no pictures, but we had a fire up here in Dec., 1932, in which I lost everything, records and photos of old works and places I was in.

"About 1903 I took a Chicago Vulcan made by the Chicago Vulcan Iron Works, down near Atlanta, Georgia, for the Cincinnati Equipment Company.

"She had a monkey-motion valve on her main engine, three big drums and gears, and a friction clutch that threw another clutch in on each drum. She had some power, but would load only about 9 feet at 2 blocks. There was a reverse engine on the crane (I connected the throttle to the reverse lever.) At times it would get full of steam on center and stick, but when it let go, the dipper would shoot out, or in (depending on the reverse lever) like the Thompson-Bucyrus. If one didn't get over the car on time, it was just too bad. There were only two of these machines made for the drainage canal in Chicago. The last I saw of that one, one of the big gears broke in half. J. McKee was my boom cat.

"I was operated on for ticdalouroux in 1927 at Albany, New York, and came out paralyzed on one side, so I have been out of commission ever since. Now I am staying with the deer eight miles from Coreys, our nearest inhabitants in the northern Adirondacks. The Excavating Engineer and other magazines are sent me by a friend in New York, so I keep fairly well posted."

Thanks, Old Timer Pode. Come again.

Steam Shovel Dream of About 1834

HERE is a unique bit of old time shovel history that comes to us from merry old England. The plate illustrated was located by A. H. Bartlett of Lincoln, England, in the possession

of one of his friends in Nottingham. It is a family heirloom and is reported to be about 100 years old. The grave digging machine illustrated was no doubt the product of several tankards of English ale and the artist's imagination, so don't ask us how it works. It was no doubt considered a wild bit of fancy at the time . . . but

(Continued on Page 253)

EXCAVATING ENGINEER

A Monthly Publication Devoted to Excavating and Allied Subjects

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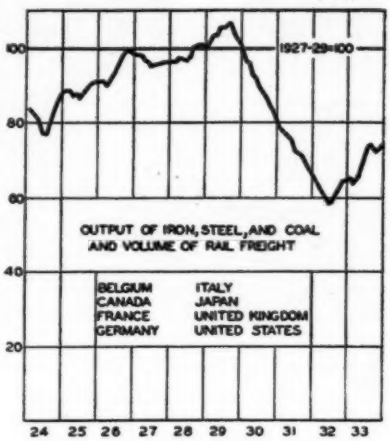
The Business Situation

IMPROVEMENT in business has been satisfactory during the first four months of this year. The New York Times curve shows it at almost eighty-five per cent of normal for the first week in April. Automobile production has gone well above the weekly average of the years from 1923 to 1925. Bond prices have been steadily rising for almost five months, and stock prices are showing a healthy steadiness, with a tendency to rise. Steel production largely supported, perhaps, by the activity in the automobile industry, has been showing healthy increases. A considerable number of threatening labor disputes and strikes have been averted, and it now seems likely that we shall escape any period of numerous and serious strikes, which would certainly cause serious setbacks in our approach toward better business. Factory employment has increased by approximately six per cent and factory payrolls have gone up almost twelve per cent.

All of these are healthy signs, all appear to point to more healthy conditions. But it is misleading if one overlooks the fact that almost half of those employed by industry in normal times, are engaged in the production of durable goods—goods that are bought by commitments against the future—goods that are not constantly consumed by every day life. During the depression, production of producer goods was reduced a great deal more than production of consumer goods, and it was in the capital goods industries that most of the unemployment was found. The way out of the depression does not lie in subsidizing consumer purchasing power. It must be found by reestablishing methods of financing purchase of durable goods. One of the best presentations of the condition in regard to capital goods is contained in the Cleveland Trust Company's Business Bulletin for April 15. We quote as follows:

"The statistical evidence shown here this month indicates that there was no serious overproduction of durable and capital goods just before the depression, but that serious shortages have developed during the depression. Durable goods as distinguished from consumption goods, are those made of the lasting materials. In the main they are not bought at retail, and in large part they are paid for by borrowed funds secured from bond issues, mortgages, and installment notes.

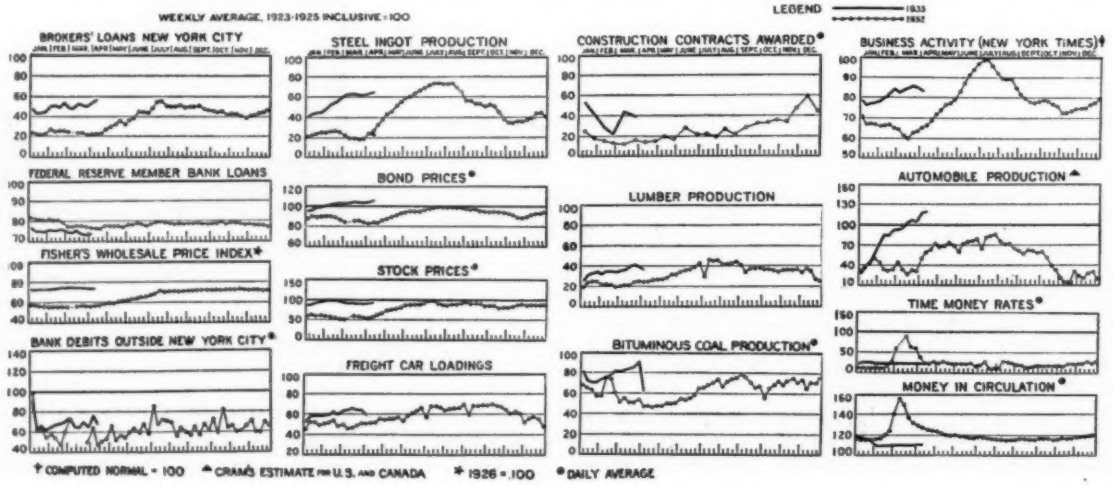
"The most important classes of durable goods are those made from iron and steel and other metals, transportation equipment

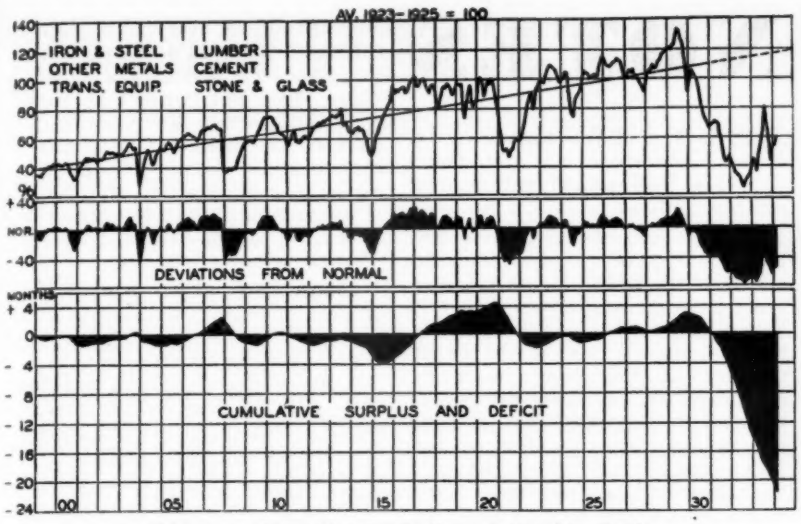


International Business Index

including railroad rolling stock, automobiles, airplanes, and ships, lumber, cement, stone, clay and glass. The largest purchasers are corporations. The diagrams at the top of page 229 show the monthly changes in the physical volume, but not in the value, of the

WEEKLY BUSINESS INDICATORS





Volume of Industrial Production of Durable Goods

industrial production of durable goods during the past 35 years.

"The top section is the index of production. It is based on the data, the weightings, and the methods used by the Census and the Federal Reserve Board in the construction of their indexes of production. A straight line computed by the method of least squares and based on the data from 1899 through 1930 inclusive, has been drawn through the irregular index line to show the trend, and to serve as a computed normal from which to measure the plus deviations of the prosperity periods, and minus deviations of the depressions. The black silhouette of the middle section shows the percentages by which production exceeded this computed normal or fell below it.

"The lowest diagram was made by cumulating the data of the middle one. The percentages by which production exceeded normal were continuously added until a depression period was reached, and then they were subtracted. If production had been above normal by 10 per cent for 10 months the accumulated surplus would equal the normal output for one month. The theoretical surplus so measured in terms of normal monthly output was a little over four months in 1920, and nearly three months in 1929.

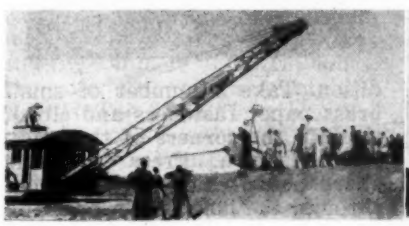
"The accumulated shortage was four months in 1915, and nearly 22 months in February, 1934. Despite technocracy the fact is that no serious surpluses of durable and capital goods were accumulating before the depression. Present shortages are acute in durable goods, and minor in consumption goods. Unemployment can not be cured by subsidizing consumer purchasing power, but can be cured by reestablishing financing of durable goods production."

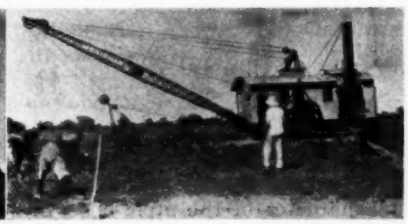
A number of times, in these columns, we have commented on the international aspect of the present depression, not in the attempt to fix blame for its occurrence, or credit for its correction or partial correction, but rather to suggest that by bearing in mind its international character, we may better judge the importance of current events and gain more accurate knowledge for our guidance in the future. It is noteworthy that business conditions in several countries began to show healthy improvement many months before such improvement made its appearance in this country. Many countries have shown much greater improvement than we have. We reproduce herewith an international business index prepared by the Cleveland Trust Company. It is not greatly unlike the index for our own country, and yet it is a composite of conditions in eight countries. Both Japan and the United Kingdom have shown a great deal more improvement than we have, and if industrial production alone were considered, many countries have shown more improvement than has the United States.

Mining Congress Meets May 7 to 11

THE ELEVENTH annual convention of practical coal operating men and national exposition of coal mining equipment will be held in Music Hall, Cincinnati, Ohio, May 7th to 11th.

MORE PICTURES FROM S. T. I. N.





THOUGH these pictures might, at first glance, look as though they were made on a CWA project here in the U.S.A. they actually come from French Sudan in south and west of the Sahara Desert. In the March issue of Excavating Engineer we presented a very complete article describing this interesting project requiring some 46,000,000 cubic yards of excavation. Since this article was published we have received, through the courtesy of one of our readers, a collection of additional snap shots taken on the operations of Service des Travaux d' Irrigation du Niger. Three of these pictures which show one of the early Bucyrus-Monighan walking draglines are shown here. This machine carries a 2½-yard bucket on a 55-foot boom.

FIELD NOTES

Broken Compressor Valve Causes "Chain Knock"

A CONTRACTOR called for a service man believing he was having trouble with his Morse Drive Chain. He said that the chain was knocking badly and that they had taken the chain apart and tried to tighten it, but found that they could not. However, there seemed to be nothing wrong with the chain and they were unable to locate the cause of the knock. It was found upon the arrival of the service engineer that they had not examined the compressor valves, one of which was found broken and the disc and springs completely gone.

This oversight caused a one-half day delay in addition to costing the contractor the expense of a service engineer.

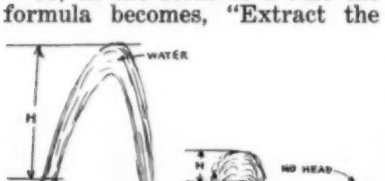
Simple Water Flow Measuring Method

A SIMPLE and dependable way in which to determine the rate of water flow through a pipe, hose, fitting, or whatever it may be, is indicated in the accompanying sketch, Fig. 1. Turn the jet upward at an angle that will give you the greatest height H you can get and then apply this formula:

$$5.65d^2\sqrt{H}=G$$

where d = internal diameter of pipe in inches; H = maximum height H of jet in inches; G = gallons per minute of flow.

Or, in the form of a rule the formula becomes, "Extract the square root of the maximum height of the jet in inches, multiply by the square of the internal diameter of the pipe, hose, or fitting, in inches, and then multiply that product by 5.65. The result is the number of gallons of water flowing per minute."



Example: If the maximum height H is 16 inches, and if the internal diameter of the pipe is ½ inch, how many gallons will flow per minute? The square root of 16 is 4, and the square of ½ is ¼. Therefore we get this: $4 \times \frac{1}{4} \times 5.65 = 5.65$ gallons per minute.

The method used in deriving the above rule for determining the flow of water is simple and easy to understand, as follows: When any object or body falls through any height H the exact velocity of the body is easily computed at any time by applying the well known laws of falling bodies. Extract the square root of the drop in feet and multiply by 8. Thus if the drop is 16 feet the velocity is $4 \times 8 = 32$ feet per second. That being the case it is evident that the self-same velocity must be given to any body in order to throw it up to the height H. That is, throw a baseball upward with a velocity of 32 feet per second and it will go to a height of 16 feet. Or, if water has a velocity of 32 feet per second at the end of the pipe the jet will rise to a height of 16 feet.

So now, knowing the maximum height of the jet H and the internal diameter of the end of the pipe it is easy to determine the flow. The calculations result in the very simple formula, or rule, given above.

Theoretically the maximum height H is attained when the jet is perfectly vertical. Thus a baseball thrown upward will go higher when the direction is perfectly vertical than when thrown at the slightest angle from the vertical. But a stream of water is different. In the case of a water stream the water on the way down interferes with the up flow stream when the jet is perfectly vertical. For that reason it is necessary to give the jet a slight angle from the vertical—so that the downward moving particles will not touch the upward moving particles. So, as suggested above, experiment with the angle until the maximum height H is attained. My sketch purposely shows a greater angle from the vertical than is necessary. I have exaggerated my sketch somewhat in order to make the method perfectly clear.

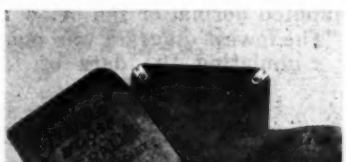
In the event that you are pumping out of a foundation excavation and only a small height H is secured, as shown in Fig. 2, the same formula still applies. In this case the downward flowing water does not conflict so much with the upward flow because the path of the water is determined immediately upon leaving the pipe. It is only when the height H is so small that it cannot be measured, as in Fig. 3, that this method is not applicable.

Small flow, as in Fig. 3, can be measured by "baling out" the pipe, if possible, more rapidly than the pipe overflows, pouring the baled water into a 5-gallon can, or other vessel of known capacity. Make note of the time required to fill the vessel. Thus if it takes 2 minutes to fill a 5-gallon can you know that the water flows at the rate of $5 \div 2 = 2\frac{1}{2}$ gallons per minute. Or, if the water can be temporarily turned into a vessel of known capacity without baling, as from a hose, so much the better. There are numerous ways in which water can be measured, of course. What I wish particularly to point out here is that when water is thrown vertically or almost vertically into the air, the method of flow determination is surprisingly simple.

—*W. F. Schaphorst, M.E.*

To Keep Note Book Corners in Good Condition

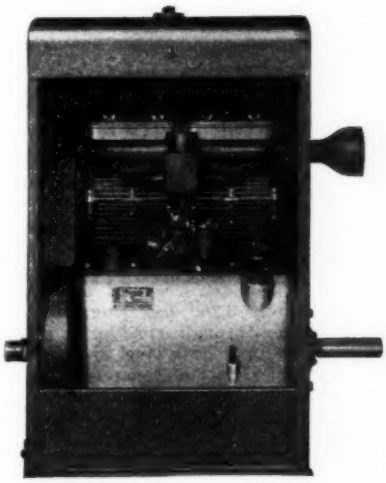
THE corners of the common pasteboard covered note book when continually carried in the pocket soon frill and curl up, and quickly put a good portion of the leaves or sheets in the same condition. Take a number of small brass paper fasteners and clinch them to the corners of the booklets as shown. Press down the sharp point which may come up through the hole in the brass on one side after the clip is pressed together. This to prevent it from catching on the interior or lining of the pocket. A book of this kind, which is so handy, can be carried and used for months, and the corners and sheets inside will remain in perfect condition.



—*Frank W. Bentley, Jr.*

EQUIPMENT
You Ought to Know About

Wisconsin Announces Four Cylinder Heavy Duty Air Cooled Engine



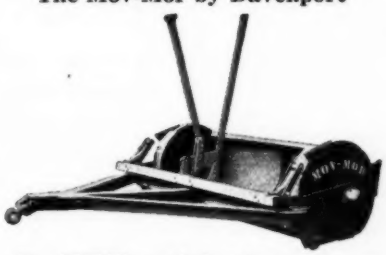
PRONOUNCED success with a single cylinder heavy-duty air cooled engine and a growing demand for air cooled engines of greater horse-power, is advanced by *Wisconsin Motor Corporation, Milwaukee, Wisconsin,* as the forerunners to the recent announcement of a new heavy-duty 4 cylinder air cooled engine of 6 to 16 horse-power capacity.

This engine, called model "AC4", has a 2⅝ inch bore and 3¼ inch stroke with a piston displacement of 70.35 cu. in. It develops 10 H.P. at 1350 R.P.M., 12 H.P. at 1600 and peaks at 16 H.P. at 2600 R.P.M. An outstanding feature of this model is its very light weight, the engine with accessories weighing only 215 pounds and the complete unit with house, gas tank, etc., weighing only 265 pounds. The overall length of the complete unit is only 20¼ inches. This unit has been particularly designed for the heavy-duty service of the contracting, industrial, agricultural, and automotive fields, and because light weight is very essential, materials of high tensile strength are employed to keep the weight down. Wisconsin Motor Corporation will gladly furnish detailed specifications on request. Please refer to *Excavating Engineer* when writing.

New Haiss Leader

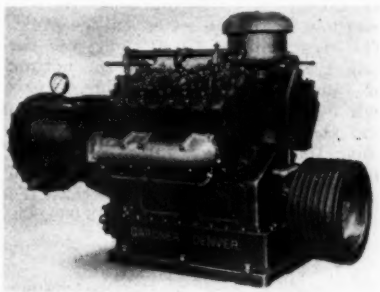
THE *Geo. Haiss Manufacturing Company* of 141st to 144th Streets on Park Avenue, Canal Place and Rider Avenue, New York, N. Y., have just announced an entirely new loader which they call the Model 135. This new and larger loader has a capacity for handling 5 yards of crushed stone per minute according to the manufacturers as compared with the companion model 80 announced some two years ago which is rated at 3 yards per minute. The manufacturer reports than on actual stop watch test performances at a New Jersey quarry the new loader put a 17,000-pound load of two-inch stone on a truck in 63 seconds. The machine is priced well under $6000. One outstanding feature of the Haiss loader is the size of the buckets which are 36 inches wide. A 65-hp gasoline engine is used and it is claimed that the machine will wade into a pile of 2½-inch stone and maintain its performance. Manganese steel is used for all parts subject to abrasive wear. The tip of the discharge chute is 7 feet 5 inches beyond the bumper and gives a 9 foot 3 inch ground clearance beneath thus permitting big loads to be easily handled. A new bulletin has just been issued and will be gladly forwarded by the Geo. Haiss Company on request.

The Mov-Mor by Davenport



A NEW revolving type scraper recently put on the market by the *Davenport-Besler Corporation* of Davenport, Iowa, is called the "Mov-Mor." The manufacturers claim instant response to control of the tractor operator, ability to scrap lightly, dig deeply, spread the load, or dump completely without change of stops, and ruggedness that prevents buckling or twisting in hard, gruelling service. The tongue is equipped with a swivel draw bar to eliminate shocks on the tractor as well as the scraper. The bowl is free from obstructions to permit free discharge. Bottom board and cutting edge are made of high compression steel to withstand wear. The Davenport Mov-Mor scraper is made in seven sizes ranging from 12 to 56 cubic foot capacity.

Gardner-Denver Vertical Compressors



A NEW LINE of vertical compressors was recently announced by the *Gardner-Denver Company, Quincy, Illinois.* According to the manufacturers, these verticals make possible not only a saving in floor space, but also involve lower installation and maintenance costs.

The new line is said to embrace such features as: cushioned inlet and discharge valves, extra large water jackets, water cooled intercooler, forged steel large diameter crank shafts, pressure feed lubrication, rotary oil pump and others. Complete specifications and prices will gladly be sent to any interested reader in the industry of excavation by the manufacturers. Please use the convenient card found in the center of this copy when writing, or mention *Excavating Engineer* in your letter.

Johnson's Little Titan Scale

SPECIALLY designed to meet the requirements and needs of the small concrete job where weight proportioning of sand, gravel or stone is specified, Johnson's "Little Titan" fills the bill with accuracy, strength and convenience of handling. The scale folds and two men can readily handle it to load or unload from a truck. It can be used as a one, two or three weigh-beam scale

(Continued on page 252)

SHOTS *from the Firing Line*

Parker Dam Bids Probably Taken This Month

By H. L. LIVINGSTON

THE Bureau of Reclamation, Denver, will probably call for bids in May for the Parker Dam to be built by the Bureau for the Metropolitan Water District of Southern California. This Dam is to be of concrete, full overflow, with five gates on the crest. The crest will be 740 ft. long and the height about 320 ft. above the bottom of foundation. Two diversion tunnels will be built, each 35 ft. in diameter, and about 2500 ft. long. This will involve 150,000 cu. yds. of excavation in addition to 100,000 cu. yds. of approach excavation. It is estimated that the total cost of this job will be $13,000,000.

PWA Ruling Modified

FOREMEN and master mechanics who occasionally have to work with tools are no longer restricted to a 30-hour week according to a new ruling just issued by the PWA. It states:

"Foremen who work intermittently with tools are not restricted as to total hours of work provided they work no more than 30 hours per week with tools. Their duties need not be limited to one shift. This decision applies to Master Mechanics and Foremen Mechanics."

Fort Peck Dam Diversion Tunnels Awarded

SILAS MASON COMPANY, INC., 500 Fifth Ave., New York City and the Walsh Construction Company, Davenport, Iowa, who submitted a joint bid, were awarded a contract for the construction of four diversion tunnels, each approximately one-half mile long and 28 feet in diameter, at the Fort Peck Dam. Their total bid was $7,311,940. The prices on excavation ran as follows: open cut shale excavation, 718,000 yds. at 75c a yard; open cut overburden excavation, 308,000 yds. at 75c a yard; pilot tunnel excavation, 24,600 lin. ft. at $45 a foot; main tunnel, 709,200 yds. at $2.70 a yd., shaft excavation, 144,000 yds. at $6.00 a yard.

This contract also calls for the furnishing and placing of approximately 11,500 tons of structural steel shapes and reinforcing bars, also the placing of 444,500 cu. yds. of concrete.

Since the tunnels will divert the waters of the Missouri River around the site during construction of the dam, it is necessary that they be bored before actual digging and constructing of the huge dam can be started.

Subcontractors' Bids Protected

IN ORDER to minimize a rather common practice on the part of contractors of shopping around among "subs" after the opening of bids, the PWA has had the following provision inserted in all requests for bids on Public Works projects:

"Every contractor who bids upon a project financed in whole or in part by loans or grants from the PWA shall submit in a sealed envelope with his bid to the contracting authority the names of all subcontractors and their bids upon which his bid is based. The sealed envelope so submitted shall have on it the name of the contractor with the words thereon 'Bids of Subcontractors'. Such submission shall be deemed to constitute an acceptance by the contractor, if awarded the contract, of the bid of each subcontractor. Any alteration therein, after the award of the contract, shall be subject to the approval of the contracting officer of the Federal Department or Agency concerned."

Progress on Public Works Highways to April 14, 1934

PROGRESS made on emergency construction of public works highways to April 14 under the supervision of the U. S. Bureau of Public Roads shows a total of 7,213 projects, estimated to cost $359,241,000, had been advertised for contract, begun by day labor employed directly by the highway authorities, or completed. The cost of the day labor projects included in the above is estimated at $24,944,000.

Of the 6,460 projects awarded for construction, 4,387 were under construction on April 14, and 965 were completed. The work under construction, estimated to cost $254,674,000, was giving regular employment to 124,728 men.

In the whole country, work under way and completed involved 84.1 percent of the $400,000,000 provided for public works highways under Section 204 of the National Industrial Recovery Act.

Rebids on All-American Canal to be Opened May 22nd

By H. L. LIVINGSTON

BIDS will be opened May 22 by the Bureau of Reclamation, Yuma, Arizona, for about 32 miles of the All-American Canal. The work to be let will probably be from Laguna Dam to Station 1860 in six schedules. This will include the three schedules from Station 1130 to Station 1160 which total 21,774,000 cu. yds., bids on which were opened December 20, 1933 and rejected by the Bureau. Bids on the new work contemplated will involve 38,500,000 cu. yds.

Yaquina Bay Bridge Letting

THE OREGON State Highway Commission has asked for sealed bids for the construction of a bridge to carry the Oregon Coast Highway across the Yaquina Bay at Newport. The closing date is May 17. The plans call for the construction of a bridge approximately 3,260 feet long, with a 27-foot semi-through steel arch span and two 350-foot deck steel arch spans with 284 lineal feet of concrete viaduct on the northerly end and with five reinforced concrete arch spans totaling 1052 feet in length and 600 lineal feet of concrete viaduct at the southerly end across Yaquina Bay.

Sales of Explosives Increased Nine Percent in 1933

THE QUANTITY of explosives manufactured in the United States and sold during 1933 for use in mining and quarrying, and for other industrial purposes, amounted to 255,989,391 pounds, according to reports received by the United States Bureau of Mines from companies engaged in the manufacture of explosives. This figure represents an increase of nine percent over the quantity sold in 1932. Sales during 1933 included 64,210,675 pounds of black blasting powder, 33,927,443 pounds of permissible explosives, and 157,849,273 pounds of other high explosives. (Permissible explosives are high explosives that have passed certain tests by the United States Bureau of Mines to determine the relative safety and suitability of the explosives for use in coal mines). When compared with 1932, the quantities of explosives sold in 1933 represented an increase of 5 percent for permissible explosives, 14 percent for other high explosives, and less than 1 percent for black blasting powder.

Mining and quarrying operations used 99 percent of the total quantity of permissible explosives, 51 percent of the total quantity of other high explosives, and 92 percent of the total quantity of black blasting powder.

Teacher: "Why, Tommy, surely you know what the word mirror means. What do you look at after you've washed, to see if your face is clean?"

Tommy: "The towel, ma'am."

High speed reverse transmission saves time of turning

all jobs ARE ALIKE TO LINN

With excavation running over 50 per cent rock on this tough Blue Ridge Mountain job in Grayson County, Virginia, schedules are being maintained with LINNS. In bad weather or good . . . on the flats or on the steepest grades, the LINN gives maximum service every day. It is because of LINN'S ability to conquer these tough assignments at below-average costs, that contractors everywhere are putting their haulage problems up to LINNS. They know the advantages of LINN flexible traction . . . they know that LINN'S greater power and higher speeds mean more trips per day . . . they know the advantage of a unit which carries its own payload and has four forward and four reverse speeds. They have proved conclusively that these and other LINN advantages mean lower yardage costs . . . You need all the facts on LINN haulage . . . Write for complete data.

LINN TRACTORS

LINN PRODUCTS ARE PATENTED

THE LINN MANUFACTURING CORPORATION

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Canadian Linn Distributors: Mussens Limited, Montreal

For your convenience in writing to The Linn Manufacturing Corp., you will find a card bound in this issue.

Shots From the Firing Line—*Continued*

Grand Coulee Dam Bidding June 18th

SEALED BIDS will be received at the office of the Columbia Basin Commission, Spokane, Washington, until June 18 for furnishing labor and materials and performing all work for the construction of the Grand Coulee dam and power plant, Columbia Basin project, Washington. The work is located near Almira, Washington, and about 100 miles west of Spokane.

The principal items of work and the advance estimated quantities are as follows: 11,450,000 cubic yards of all classes of open-cut excavation; 1,500 cubic yards of tunnel excavation; 50,000 cubic yards of backfill; 30,000 cubic yards of riprap; 3,260,000 cubic yards of concrete; 40,000 cubic feet of grout; drilling 72,000 linear feet of grout and drainage holes; placing 22,000,000 pounds of reinforcement bars; installing 1,100,000 pounds of small metal tubing, pipe, and fittings; installing 8,700,000 pounds of plate-steel penstock pipe; installing 1,600,000 pounds of structural steel in power house; installing 120,000 linear feet of electrical coduit; installing 125,000 linear feet of metal sealing strips in contraction joints; and installing 15,750,000 pounds of gates, gate hoists, conduit linings, butterfly valves, hoists, cranes, and trash-rack metal work.

The work must be completed in 1650 days. Bid security in the sum of $2,000,000 will be required. Performance bond in the sum of $5,000,000 will be required. The charge for copies of the specifications and drawings is $5.00, not returnable.

For particulars, address the Bureau of Reclamation, Almira, Washington; Denver, Colorado; or Washington, D. C.

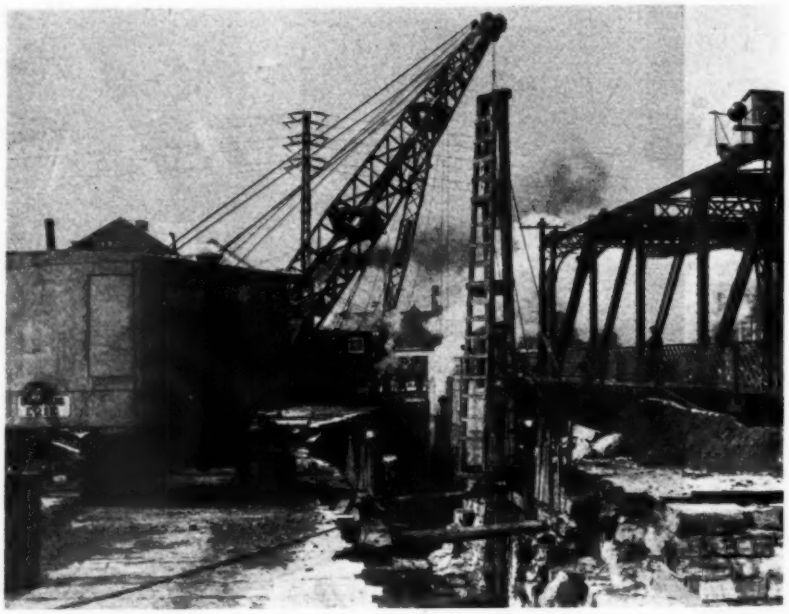
Montreal and Vicinity

By S. A. STEPHENS, JR.

Construction activities **show signs of picking up,** but are being retarded by the weather. The past winter, "the most severe in the memory of the oldest inhabitant," seems loathe to leave. The frost has penetrated to an unprecedented depth, which slows up all excavating.

Tunnel sewer contracts in the northeastern part of the city are held by **Geo. Mills and Sons, Ltd., Anglin Norcross Corporation, Ltd.,** and the **Belmont Construction Company, Ltd.** Tunnels are 5' horse shoe section and mostly through rock, some of which will take over a year to complete.

The Provincial Government promises a start this year on the **new highway to the northern mining country.** The total distance is about 450 miles, of which about one third, is now covered by secondary roads. It is not known whether the work will be done by contract or, as an unemployment relief measure.



A few jobs are in progress, however. **The Campbell Construction Company** has a contract to repair the approaches to Lock No. 2 in the Lachine Canal where extensive work is being done. The photograph shows a 43-B driving wood piles around the swing bridge foundations. A drop hammer is used. In the background an Industrial crane is driving steel piling around the north abutment of the bridge with a McKiernan Terry 9B-2 Hammer. Both machines travel on a trestle across the canal. When the photo was taken the canal had been dewatered for the annual spring repairs.

New York Notes

By G. E. PETERSON

New York State Highway lettings since March 2nd have included the following: **Warren Bros.,** Cambridge, Massachusetts, $84,441 for 1.59 miles concrete and grade separation in Chemung County . . . **Wm. P. McDonald** of New York City, $35,171 for constructing bridal paths and walks in Queens County . . . **O'Driscoll & Grove** of New York City, $132,855 for a grade separation on the Grand Central Parkway in Queens County . . . **The Carleton Co. Inc.,** of New York City, $94,975 for a grade separation in Nassau County and also $111,442 for a grade separation on the Grand Central Parkway extension in Queens County . . . **P. T. Cox Company** of New York City, $158,032 for a grade separation on the Interborough Parkway in Queens County . . . **The Ed. Smith Company** of Syracuse, $29,396 for paving in the City of Fulton in Oswego County . . . **Sweeny & Boland** of Rochester, $221,095 for 1.19 miles of 40-foot paving in Monroe County and also $12,519 for landscaping in Monroe and Wayne Counties . . . **Clarence L. Smith,** New York City, $41,346 for overhead bridge at Brewster in Putnam County . . . **Harp & Conway,** Kingston, $60,608 for 1.06 miles of concrete in Ulster County.

Brescia and Strada have commenced work on their Putnam County job having moved their two Bucyrus-Erie 42-B steamers on this work. Mr. Brescia is in charge of the new job and Mr. Strada is completing the Sullivan County job which will be completed about August 1st. Their Bucyrus-Erie 16-B shovel is being used to clean up the Sullivan County job.

The Delma Construction Company of the Bronx is moving its Bucyrus-Erie 41-B steamer on the J. W. Williams job in Westchester and Putnam Counties to complete about 80,000 yards of excavation.

New Jersey Notes

By H. M. DAVISON

Highway legislation, before the Assembly and Senate of the State of New Jersey, **contemplates the following expenditures;** construction, reconstruction and maintenance of county roads, $6,000,000; construction, grading and maintenance of township roads $2,100,000; construction of roads, bridges and grade crossings and the purchase of right of way for the state highway system $14,711,000; maintenance on same $2,500,000.

Union Building and Construction Company, of Passaic was awarded a contract April 17th for the construction of a bridge on Route 23, Butler, Morris County.

Wm. Eisenberg and Sons, Camden, received contracts totaling $135,000 for road jobs near New Brunswick.

Jesse A. Howland & Sons, Inc., Seabright, recently purchased a 5-ton Bu-

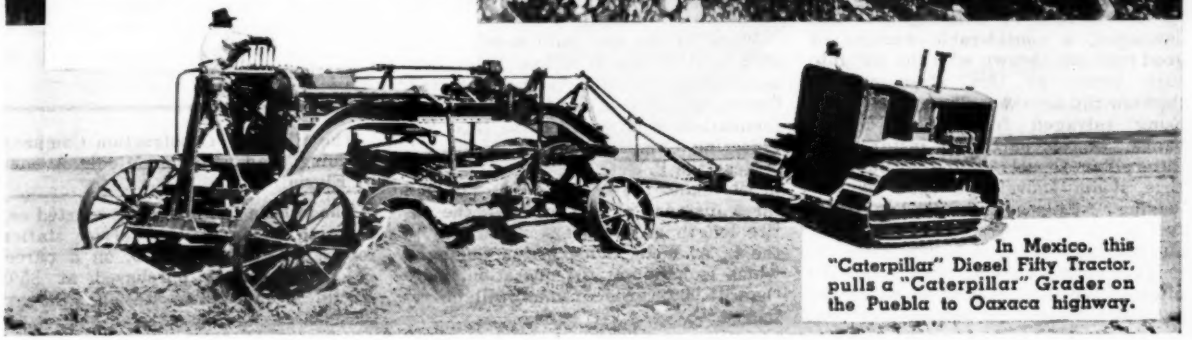
"Our fuel saving is $4 to $5 per 8-hour day with the 'Caterpillar' Diesel"

• • says the Chairman of a Kansas County Board of Commissioners, whose "Caterpillar" Diesel Fifty Tractor pulls a 12-foot grader on 70c to 80c worth of 4½c fuel per day.

Near Audenried, Pennsylvania, the Dick Company is using "Caterpillar" Diesel Seventy-Fives to strip coal efficiently.

Near Seattle, this "Caterpillar" Diesel Fifty builds trails in clay soil, operating on 13½ to 14 gallons of low-price Diesel fuel per 8-hour shift.

The fuel economy of the "Caterpillar" Diesel makes power dollars do more work—gives public bodies more miles of road for fewer taxpayers' dollars—gives contractors the advantage of lower costs, bigger spread between expense and income. For the "Caterpillar" has added simplicity and a uniform high standard of performance. Get the complete story. Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

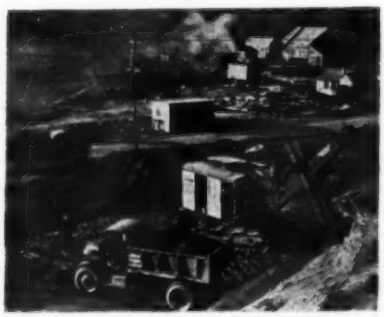


In Mexico, this "Caterpillar" Diesel Fifty Tractor, pulls a "Caterpillar" Grader on the Puebla to Oaxaca highway.

For your convenience in writing to Caterpillar Tractor Co., you will find a card bound in this issue.

Shots From the Firing Line—*Continued*

cyrus-Erie rock grab which will be used on their jetty job at Ocean City, Maryland. The grab will be handled by their Bucyrus-Erie GA-2 crane.



On a state highway project in northern New Jersey, **Wm. Eisenberg & Sons** of Camden have made an excellent record run with their two Bucyrus-Erie 37-B shovels. Operated in one pit a total of 388 shovel hours, these machines had actually moved, by cross-section measurement 105,630 cubic yards. This shows an hourly output per shovel of 272 cubic yards bank measure. I. Eisenberg, Secretary of the company, tells us that at other locations these shovels have moved between 200 and 300 cubic yards per hour, depending, of course, on keeping equipment alongside at all times to move the spoil away.

Pennsylvania Notes

The accompanying illustration shows the operations of **John Booth, Inc.**, at the Greenwood Colliery, Minooka, Pennsylvania for the Hudson Coal Company. In past years, before the present method of cleaning coal was developed, a considerable amount of good coal was thrown with the dirt into such banks as this after passing through the breaker. This coal is now being salvaged from these "culm" banks. In this particular instance the Caterpillar Diesel 35 and a Bucyrus-Erie steam shovel are used for the loading. At places the culm bank is 90 feet above the shovel and the tractor and bulldozer are used to hold down the heighth of the working bank. Also the pitch of the solid ground on which the bank is built was, in places, such that the shovel could not negotiate it, and in other places layers of ashes where fires had occurred in the banks needed to be pushed aside separating the culm, which consists of coal and dirt, for loading to the colliery. About 40 railroad cars, or 2800 cubic yards of culm, is loaded each day. The Diesel tractor consumes a trifle less than one gallon of fuel oil per hour on this work and in the four months that John Booth, Inc., operated it on this job no repairs has been required. At the Colliery the culm is run through machines that separate the good coal from the dirt.

Here is a 52-B Bucyrus-Erie dragline with Caterpillar Diesel engine casting overburden on **J. Robert Bazley's** operations at Indian Head Coal Company properties. These modern draglines are proving their ability to handle excavation formerly considered too heavy for dragline methods as can be seen from this spoil bank.

The Marcus Contracting Company, New York City, was recently awarded contract for the second section of the Delaware River Bridge at Philadelphia on their bid of $1,373,999.

Ohio Notes

By HENRY F. UNGER

The Port Clinton Dredge Company has opened the season by starting work in the channel of the lagoon at the Port Clinton Yacht Club, where the channel will be deepened, in Port Clinton.

Work on the new million-dollar cold strip mill of the Wheeling Steel Corporation in Yorkville has been started. Contracts for the excavating and for foundations was awarded the **Rust Engineering Company** of Pittsburgh.

Near the P. & O. docks on Lake Erie in Cleveland the **lake is being dredged** for a distance of 100 feet out, the entire length of the dock. According to the **L. A. Wells Construction Company** which is handling the operation, more than 15,000 yards of mud will be removed.

The annual spring dredging of the channel on the Cuyahoga River has been started under a contract awarded to the **Great Lakes Dredge & Dock Company.**

A low bid of $471,519 by the **L. A. Wells Construction Company**, Cleveland marine contractors, for the erection of a breakwater, pier extension, and harbor dredging at Huron, southeast of Sandusky, has been accepted by the War Department. Work will begin in a few weeks, and will employ 100 men for six months.

Acceptance of a low bid of $117,515 by the **Cleveland Trinidad Paving Company** for state highway improvements in Cuyahoga County has been announced by O. W. Merrell, State Highway Director. The Cleveland company will contract to pave more than a mile of Richmond Road on State Route 175 with brick.

JOHN M. RYAN

John M. Ryan, 82, retired street paving contractor, who had paved quite a few thoroughfares in East Liverpool died in the same town.

CHARLES MILLER

Charles Miller, 50, street commissioner of Warsaw, near Coshocton, was killed when his truck was struck by a train at Warsaw.

JOHN TOMSON

John Tomson, street commissioner of Cleveland died at a hospital after an operation.

The Highway Construction Company is doing road work on Middle Avenue in Elyria.

The Austin Company has started excavating on an artistic service station for Sears-Roebuck & Co. on a parcel of land recently purchased at 8501 Euclid Avenue. The station will cost $50,000.

Made of
Acid Open-Hearth
Steel Wire

Dependable!

YOU can depend on "HERCULES" (Red-Strand) Wire Rope for safe and economical work because all of the materials that go into it — wire, core and lubricant — are carefully selected and rigidly tested to make sure they meet our exacting requirements; moreover our manufacturing methods are such as to insure even tension on both the wires and the strands, which means that every wire and every strand does its full and equal part. *The service record of this wire rope continues to make and hold friends.*

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Established 1857

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San Francisco

Backed by
77 Years of Manufacturing Experience

For your convenience in writing to A. Leschen & Sons Rope Co., you will find a card bound in this issue.

Shots From the Firing Line— *Continued*

An appropriation of $60,000 will be used by the State Highway Department in paving the Lincoln Highway with brick through Minerva. Bids will be opened soon.

The Public Works Administration has allotted $76,300 to the army engineers for dredging in the Black River at Lorain Harbor.

Shore erosion projects and surveys to cost about $30,000 have been prepared by H. F. Gerold, County Engineer for Erie County. The program has been submitted to the state erosion board for approval.

Excavating for the new Firestone Tire & Rubber Co. building at East 18th Street and Euclid Avenue has been started by the Hunkin-Conkey Construction Company, which has been awarded the general contract of $200,000 for the building.

An application for a PWA loan and grant of $5,894,500 for construction of a steel bridge at Main Avenue and Bulkley Road and Cleveland has been received by the PWA.

Application for a Federal loan of $23,032 and an outright grant of $6,000 for repaving Waterloo road has been forwarded to PWA in Washington. Previously, an approval of the application was given in Columbus by L. A. Boulay, State Engineer for the PWA.

The PWA has announced approval of a loan and grant and three outright grants to northeastern Ohio cities for street and water works improvements. The grants will go to Cleveland Heights, Shaker Heights, and University Heights and are for $7,000, $7,100 and $1,900, respectively. Grafton, Lorain county, will receive a loan and grant of $20,000 for improvements to existing water works.

PWA has announced receipt of an application for a loan and grant of $168,200 for construction of a sewer at Berea, and a loan and grant of $22,800 for sewer work at Garfield Heights.

Garfield Heights city officials have negotiated with the Broadway Sand & Gravel Co. for the construction of a $165,000 water plant in the suburb. They offer to build the plant and operate it under a franchise.

The Canadian Railways has issued orders to reopen their Rail and River mine near Bellaire.

Sealed proposals were received up to April 26, at the U. S. Engineer office in Buffalo, N. Y. for furnishing all plant, labor and materials and performing all work required for dredging approximately 264,200 cubic yards of material other than ledge rock and approximately 63,900 cubic yards of ledge rock to enlarge the turning basin at the westerly end of the dock channel at Sandusky Harbor, including disposal of rock to construct a dike along the northerly side of the dock channel.

The government is constructing a new base for the United States Coast Guard in the lagoon east of East 9th Street in Cleveland. It will cost $44,000. Later the government proposes to dredge part of the base to a depth of eighteen feet.

The National Slag Association announces a change of address effective May 1st. The new address will be Earle Building, Washington, D. C. The former address was the Leader Bldg., Cleveland, Ohio.

Michigan Notes

The Great Lakes Dredge & Dock Company of Chicago was low bidder with a quotation of $792,800, April 3rd, on a dredging project at Monroe Harbor. The job calls for 2,265,000 yards of dredging and rip rap placing.

Illinois Notes

The McClintic-Marshall Corp., Chicago, was the low bidder on fabrication of steel super-structure for a bridge over the Illinois River at Spring Valley at a recent letting.

The Wisconsin Bridge and Iron Company of Milwaukee was low bidder on the substructure and the erection of the superstructure for this bridge.

Iowa Notes

At a letting held April 10th, by the State Highway Commission the following low bids were received; Cerro Gordo County, 1.018 miles concrete paving, Metz Construction Company, Clear Lake, $42,581 Page and Fremont Counties, 5.5 miles concrete paving in 3 projects, G. W. Condon Company, Omaha, $15,108, $34,220 and $31,101 respectively; Marshall and Story Counties, 9.218 miles concrete paving, J. J. Lamoreaux, Omaha, $51,359; Marshall County, two bridge jobs, Anderson & Empie, Marshalltown, $44,270.

The Pittsburgh-Des Moines Steel Company, Des Moines and M. Wunderlich, Jefferson City, Missouri, were awarded a 5-mile road job in Benton County, Mississippi on their bid of $129,736.

M. O. Weaver, Iowa Falls, was awarded 28 miles of road surfacing in Ashley and Drew Counties, Arkansas, on a bid of $108,895.

Minnesota Notes

Winston Brothers Company of Minneapolis has announced that F. H. Holladay, who has been associated with their organization for many years, has resigned as director and vice-president of the concern.

Oliver Iron Mining Company is giving its large crushing and screening plants a complete overhauling, and a heavy program is under way on repairs to electric power shovels and locomotives.

North Dakota Notes

W. H. Noel Company, Jamestown, was awarded a 12.826-mile grading job in Ward and Mountrail Counties for $42,980, and a 4.96-mile job in Richland County for $10,781.

M. B. Monson, Bismarck, was awarded a 8.29-mile grading job in Logan County for $17,815 and a 11.6-mile job in McIntosh County for $27,243.

South Dakota Notes

By PAUL G. FRIGGENS

Construction projects for South Dakota highways totaling approximately $900,000 have been let here during the past month. Awards were made on 34 of the 36 projects advertised, some of which are:

C. A. Wagner Construction Company, Sioux Falls, 2.625 miles, concrete paving in Yankton County for $66,357; 1.620 miles concrete paving in Lincoln and Union Counties for $49,756; and .170 miles concrete paving in Minnehaha County for $13,047. Dowd Bros., Inc., Clark, 5.306 miles grading in Marshall County for $28,704; 5.988 miles grading in Jerauld County for $14,549; 6.998 miles grading in Hanson County for $18,911; 6.011 miles grading in Davison County for $17,127; 6.953 miles grading in Davison County for $18,233; a 122-foot bridge in Codington County for $7,250; a 64-foot bridge in Jerauld County for $6,132 and a 45-foot bridge in Corson County for $3,870. The N. W. Engineering Company, Rapid City, 1.511 miles grading in Lawrence County for $20,994; 4.485 miles grading in Lawrence and Mead County for $21,168; a bridge widening job in Butte County for $6,920, and a 64-foot bridge in Jackson County for $5,610. H. J. Hawley, Aberdeen, 2.009 miles for grading in Codington County for $15,293. G. W. England & Sons, Murdo, 9.484 miles grading in Tripp County for $61,088, Jahnig & Davis Inc., Britton, 6.037 miles grading in Butte County for $28,696; 8.853 miles grading in Corson County for $37,469.

Jarvis, Wright & Howell, Sioux Falls, 4.04 miles grading in Hamlin County for $11,757. Edward Gustafson Construction Company, Sioux Falls, 3.958 miles grading in Brookings County for $13,374. Western Asphalt Paving Corp., Sioux City, Iowa, 4.021 miles grading in McCook County for $10,893. Frank Schuknecht, Jr., Parker, 13.996 miles of gravel surfacing in Sully County for $15,489. Martin Joyce, Brandon, 8.922 miles in Lyman County for $11,960.

(Shots from firing line continued on page 242)

Cohen (entering a delicatessen store): Gif me some of that salmon.

Proprietor: That's not salmon, that's ham.

Cohen: Vell, who asked you what it was?

KNOW

"I ~~HOPE~~ I PURCHASED THE RIGHT WIRE ROPE"

A SILVER STRAND ELIMINATES DOUBT

IN THE selection of Wire Rope—the difference between "know" and "hope" is frequently the difference between economy and needless cost. There is never a doubt, as far as Wire Rope quality is concerned—or economy either—when a Silver Strand governs choice. Monitor Silver Strand Wire Rope is made exclusively by the American Steel & Wire Company—the largest manufacturers of Wire Rope in the world—and service records prove it superior in wear, strength and endurance. Perfectly constructed of the highest quality steel—and with abrasion resisting factors—it is waiting to serve you—to substitute "know" for "hope" in your next Wire Rope order.

AMERICAN STEEL & WIRE COMPANY

MONITOR

SILVER STRAND WIRE ROPE

1831

1934

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For your convenience in writing to American Steel & Wire Co., you will find a card bound in this issue.

Shots From the Firing Line— *Continued*

TVA Notes

At Fort Knox, Kentucky, the Internationals are pulling away from this Bucyrus-Erie Type B steamer at the rate of one per minute according to Superintendent Craig. Each load takes two dippers of the blasted rock. The material is hauled to crushers and the product used to surface the new 17-mile road being built through the Fort.

Tennessee Notes

A bill now pending in Congress would authorize an appropriation of $25,000,000 to construct the **Natchez Trace Parkway**, leading from Nashville, Tennessee, to Natchez, Mississippi. The pioneer settlers and traders in seeking a market for their products would float them by water to Natchez, or beyond, and then, rather than make the long and laborious upstream "pull-and-push-against-the-current" journey back by water, would return by land. The country became criss-crossed with trails, the most important being the so-called Natchez Trace, running from Natchez in Mississippi to Nashville in Tennessee. The route went through lands of the Chickasaw and Choctaw Indians. Subsequent to treaties entered into with these tribes the Congress of the United States in 1806 passed an act authorizing President Thomas Jefferson "to cause to be opened a road from Nashville, in the State of Tennessee, to Natchez, in the Mississippi Territory; provided, he shall not expend more than $6,000 in opening the same." A further appropriation of $3,000 was made in 1809 to convert the Old Natchez Trace from an Indian foot and bridle path into a usable wagon road.

Along this roadway established by the Government much history was made by the early settlers. Mail was carried over this route, a stage line was operated, and taverns were built along the way. Many tales of chivalry and bravery and even crime and violence are told about the happenings along this 500 mile road.

Landmarks along this ancient road still stand, and the old survey by the Government in the State archives at Jackson, Mississippi, gives its exact course as first laid out. The General Land Office in Washington in their old records also show this road, variously called the "Old Natchez Road", "Road to Nashville", "Nashville Road", and "Post Road".

St. Louis and Vicinity

By A. J. KOENIG

An extensive public building program, involving the expenditure of approximately $70,000,000 is in prospect for Missouri during the summer.

A survey made under the direction of H. F. Truman, State Director, shows projects costing $46,274,000, have either been started or will be started soon.

Included in the program is expenditure of $20,000,000 for approved projects under the Public Works Administration program. At present contracts have been let for $12,477,000 of highway work.

River improvement work, financed by federal funds will total $13,000,000 in Missouri.

In addition to these approved projects, an additional expenditure is contemplated for highway projects, amounting to $10,000,000.

Plans for the $7,000,000 combination **highway and railway bridge** at Baton Rouge are about ready and bids will be asked for within the next 30 days.

Plans for a new highway between East St. Louis and Alton are now under way and the engineers are now making a survey of the route. The estimated cost of the project is $1,000,000.

William F. Riley & Sons were the lowest of five bidders for the construction of a section of downtown relief sewer under Elm Street from Fourth Street to the river. Their bid of $46,651 was 13 percent below the preliminary estimate.

Not a bid was received by the Board of Public Service in St. Louis for the paving of Haven Street in Carindelet. The estimate of the work was $37,950.

A letting will be held in the U. S. Engineers Office in St. Louis on April 27th, for placing 410,000 cubic yards of earthwork in rebuilding and enlarging the levee on the Illinois River in Greene County, Illinois.

The U. S. Engineers, Memphis, will take bids May 8th on 1,052,000 cubic yards earthwork in Crawford County, Ark.

The following contractors were low bidders in the letting held at Jefferson City, Mo. this month. All these projects are for widening existing roads.

Harry Tidd, Hutchinson, Kan., 0.39 miles 20 ft. concrete, route 54, Pike county, $14,851; 0.24 miles Macon county, route 63, $10,411; 0.20 miles Linn county route 36, $17,140; 0.66 miles Clark county, route 61, $20,050; 0.66 miles Clinton county, route 69, Midwest Precote Co., $12,397; **E. L. Markham,** 0.29 miles Dunklin county, route 84, $11,305; **Sandy Hites Co.,** 0.34 miles Greene county, route 60, $11,999; **American Paving Co.,** 0.33 miles route 13, $10,264; 0.125 miles route 52, Henry county, $4,712.

Perry McGlone was awarded contract for grading 8.15 miles of highway in Pike county, Ill. at a price of $107,369.

Stranberg Bros. have contract for building retaining wall and bridge over the B. & O. Chicago Terminal Railroad in Cook County, Ill.

G. E. Hoffman Construction Co. has contract for 10.85 miles traffic bound course in Logan County. The Hurden Construction Co. have contract for three bridges in McDonough county.

R. McCalman was low bidder on two underpasses in Vermillion county.

The Central States Construction Company low bidder for 8.35 miles of grading in Pike county with a bid of $123,305.

Granite Bituminous Paving Company was low on three street paving projects in Mount Vernon, Illinois.

J. P. Babcock, Paris, Illinois, was low April 27th on 410,000 yards of earthwork in the Hillview Drainage and Levee District on the Illinois River at 16.38 cents.

River Notes

Capt. T. Dodson Stamps, formerly attached to the old Memphis Dredging District and to the U. S. Engineers Office at New Orleans, has been recently assigned to the office of Maj. John S. Bragdon, Chief of the Finance Section, Office of the Chief of Engineers, in special charge of labor relations.

Senate and House conferees on the War Department appropriation bill, agreed to an **allotment of $37,500,000 for Mississippi River Flood Control** to be spent during the fiscal year ending July 1, 1935. This amount has the approval of President Roosevelt and Budget Director Douglas.

This season's flood control program in the Memphis, Vicksburg and New Orleans Engineer Districts will be established by the Mississippi River Commission during its semi-annual inspection trip which begins May 1st from Cairo. It is possible that bids on the first of the new work may be taken about June 1st.

Memphis District

Louisiana Materials, Inc., of Baton Rouge were low at 29.83 cents per yard on 780,000 cubic yards on the Old River Landside Enlargement near East Carroll Parish, Louisiana at the bidding March 28th.

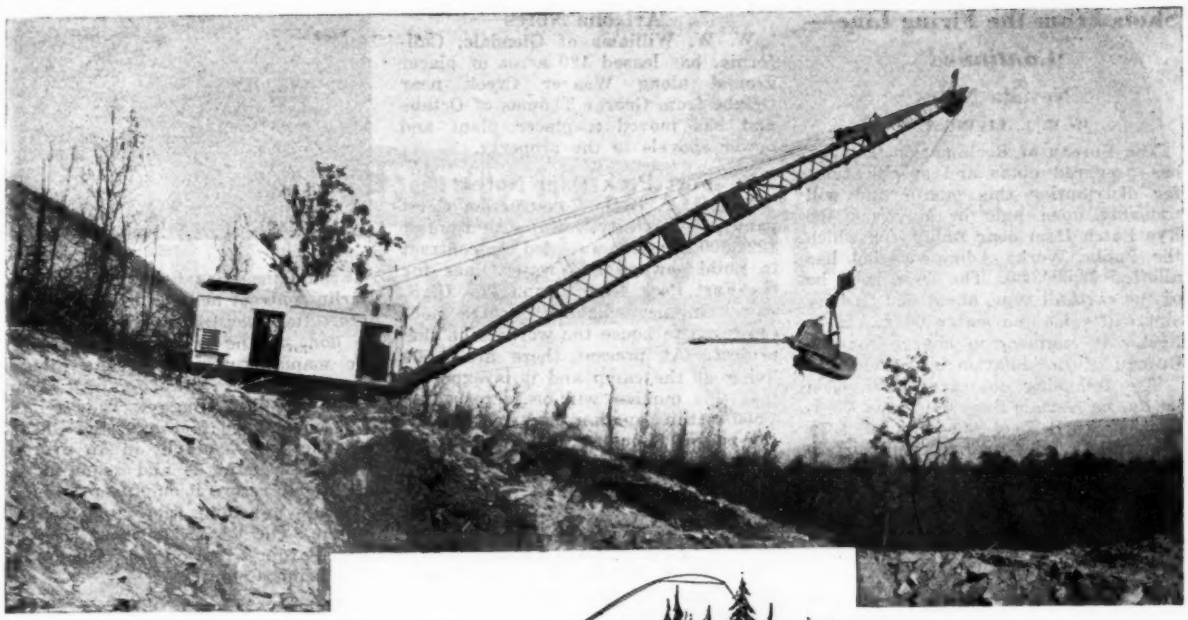
New Orleans District

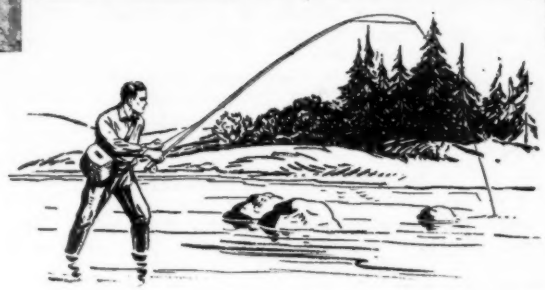
The Highway Construction Company of New Orleans was low on 940,000 yards of Atchafalaya Front Levee, April 27, at 12.4 cents per yard.

Bids will be opened May 22 for 2,990,000 yards of levee at Vidalia Point.

Texas Notes

H. B. Zachry Company, Laredo, was awarded a road job in Camal County for $202,919: **Cago Bros.,** Bishop, road job in Uvalde County for $107,086; **R. W. Briggs & Company,** Pharr, road job in Gonzales County for $318,630; and the **Lone Star Construction Company,** San Antonio, road job in Angelina County for $69,948.





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No matter whether you are using dragline or shovel—no matter whether you are dragging or shoveling in sand, clay, or stone, you'll always find an extra advantage in reliability and power in G-E electric equipment. Unfailing dependability, dogged strength, close—*exact*—control, simplified design, and economy of operation—all characterize G-E drives for shovels—all serve to make G-E drive the choice of thoughtful contractors.

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GENERAL ELECTRIC

For your convenience in writing to General Electric Company, you will find a card bound in this issue.

Shots From the Firing Line—
Continued

Nevada Notes

By H. L. LIVINGSTON

The Bureau of Reclamation, Denver, has prepared plans and specifications for distribution this month and will probably open bids in May for the **Rye Patch Dam** near Imlay, for which the Public Works Administration has allotted $2,000,000. The Dam is to be of the earthfill type, about 650 ft. long and will raise the water 50 ft. L. J. Foster is engineer in charge for the Bureau of Reclamation at Lovelock.

The following contracts have been let by the Nevada State Highway Commission: **U. B. Lee**, San Leandro, $25,479 for 13.5 miles road mix and surfacing between Pioche and Stonehouse in Lincoln County.

George Pollock, Sacramento, $143,308 for 20 miles of grading, structures and graveling in Mineral County.

Jack Casson, Hayward, California, $38,306 for 1.25 miles of asphalt retread surfacing in Carson City.

Union Paving Company, San Francisco, $111,982 for 22 miles grading and graveling and structures in Clark and Nye Counties.

Dodge Bros., Fallon, $125,886 for 4.37 miles of grading, graveling and railroad separation in Clark County.

Arizona Notes

W. W. Williams of Glendale, California, has leased 120 acres of placer ground along Weaver Creek near Octabe from George Thomas of Octabe and has moved a placer plant and power shovels to the property.

Fort Peck Dam Notes

The C. F. Lytle Construction Company of Sioux City, Iowa, with a bid of $224,000 has been awarded the contract to build sewage and water lines for the Fort Peck Dam camp. The U. S. Army Engineers have laid out a modern camp to house the workers on this project. At present there are 1,500 living at the camp and it is expected that this number will be increased to 3,500 within another six weeks.

Woodrich Construction Company of Minneapolis, Minn. received an award to construct a water filtration plant and intake at the dam.

San Francisco and Vicinity

By H. L. LIVINGSTON

The U. S. Bureau of Public Roads, San Francisco, has awarded the following contracts:

Central States Contracting Company, Oakland, $159,984 for grading and placing crushed gravel subgrade reinforcement in the Tahoe National Forest.

Tiffany Construction Company, San Jose, $37,377 for placing subgrade reinforcement in the Lassen National Park.

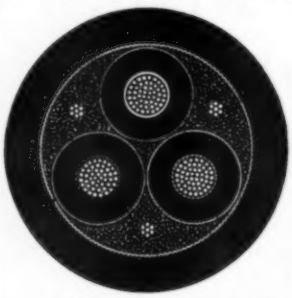
From the **Granfield, Farrar and Carlin** contract near Vallejo comes this interesting picture showing what can be done in the way of wagons when the manufacturer really lets himself go. The "cart" is a 25-yard LeTourneau Air-Wheel Buggy. They tell us that on a 1,450 foot haul the Cletrac 80 takes the load out in an average time of 5 minutes and required 4½ minutes to return it empty to the Lima. Average unloading time was one-half minute. The job is known as the Cordolia-Carqinez cut-off in Solano and Mendocino Counties.

Clarence Young, Oakland, $99,215 for grading and placing subgrade reinforcement in the Lassen National Park.

Jack Casson, Hayward, $106,086 for 10 miles placing decomposed granite surfacing and bituminous surface road mix on the Glenbrook National Forest Highway in the Tahoe National Forest.

The California Division of Highways has awarded the following contracts:

A TOUGH POWER CABLE FOR ROUGH WORK —*built to keep machines working....*



FOR your electrically-powered excavating equipment the three conductor cable with three separate ground wires, illustrated here, offers a greater compactness, flexibility and longer life. This high voltage cable is vulcanized in steel molds under tons of pressure producing an extremely tough, non-porous rubber jacket absolutely waterproof and highly resistant to oils and acids. And above all—each individual conductor is effectively treated to prevent power leakage.

Power cables ordered from Bucyrus-Erie are proving their dependability in the field.

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EXCAVATES AND CONVEYS LONG DISTANCES

Sizes: ⅓ to 15 cu. yds. Handling capacities up to 6,000 cu. yds. per day.

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HAYWARD'S fine performance without high upkeep enables you to cut costs on every digging and rehandling job.

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You probably have used standard Yellow Strand Rope to your advantage on shovels, draglines, clamshells and other excavating equipment. *Now* try "Flex-Set" *Preformed* Yellow Strand. Same super-grade, tested, selected wire. Same even balance of elasticity, flexibility, toughness and tensile strength — *plus* these special advantages.

Preforming makes the rope limber; easier to handle. You save time and money in installing. It is more quickly broken in, and is less subject to damage during this critical period. Resists kinking and birdcaging. There is less internal wear. Won't wicker. Splices easier. Far outlasts any standard construction rope — even good old Yellow Strand. Costs less in the final reckoning. Prove this for yourself.

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"Flex-Set" Preformed Yellow Strand

For your convenience in writing to Broderick & Bascom Rope Co., you will find a card bound in this issue.

Shots From the Firing Line—
Continued

Vonder Hellen & Pierson, Castaic, $153,769 for 3.3 miles of grading, graveling and stone-surfacing in Merced and Santa Clara Counties.

Oswald Bros., Los Angeles, $46,670 for 3.3 miles of grading and asphalt concrete paving in Los Angeles County.

Fredrickson & Watson Construction Company, Oakland, $456,436 for 24.3 miles of grading and fuel oil treatment in Riverside County.

Southern California Roads Company, Los Angeles, $167,952 for 7.5 miles of grading and asphalt paving in Kings County.

Healy-Tibbitts Construction Company, Oakland, $26,433 for reinforced concrete subway in Alameda County.

Basich Bros., Torrence, $265,811 for 8.1 miles grading and asphalt concrete paving in Tulare County.

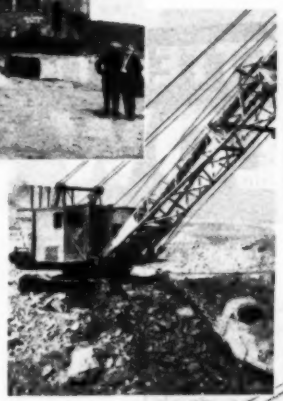
Yglesias Bros., San Diego, $131,357 for 4.1 miles grading in Madera County.

Doctor: "You must avoid all forms of excitement."

Ailing Contractor: "But, doctor, can't I even look at them on the street?"

Oregon Notes

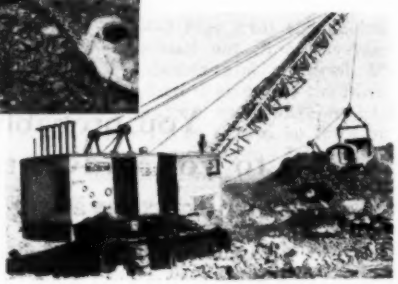
The accompanying group of pictures show three Bucyrus-Erie 52-B Diesel draglines on **J. A. Terteling & Sons** operations on the Owyhee project in Eastern Oregon. The upper view shows machine No. 9 which has moveed 1,250,000 yards on the Owyhee project. The other two, Nos. 10 and 11, were added to the fleet last December to take care of a new Owyhee contract for additional yardage secured by the Terteling organization. All these machines carry 60-foot aluminum booms and 3-yard buckets. Machines are equipped with Atlas-Imperial Diesel engines and carry Kohler light plants. A Bucyrus-Erie 43-B gasoline dragline is also being used. This carries a 45-foot boom and 2-yard bucket.



Grand Coulee Notes

By GRACE KIRKPATRICK

The Crick and Kuney Company of Spokane was low bidder April 5th on a government grading project at Grand Coulee Dam. The work included grading and structures for the highway from the head of Grand Coulee to the Columbia River bridge, and for a construction railroad from the head of Grand Coulee to the Grand Coulee Damsite. Their bid on Schedule No. 1 totaled



$220,676 which included 280,000 yards of common excavation at $78,400; 135,000 yards of rock excavation at $118,800; 7,133,000 station yards of overhaul at $7,133. Their bid on Schedule No. 2

Modern construction contractors rarely miss a chance to profit from the speed and economy of welding. For fabricating tanks, bridges, buildings—for making repairs quickly and on the spot, welding is the ideal modern tool of the contractor. P & H builds an arc welder, The P & H-Hansen, that is designed specifically for rough, outdoor service. It's simple, mobile, easy to control, economical. Write for information, today, on the P & H-Hansen Arc Welder.

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AMERICA'S FINEST FASTEST WELDER

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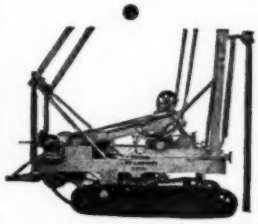

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Reduces Costs.

Spring action in crown pulley lengthens stroke, eliminates back lash or vibration, increases footage of drill hole.

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WILLIAMS *Multiple-Rope* **Bucket**

The Fastest Digger of its type!

Opens its mouth wider and bites deeper.

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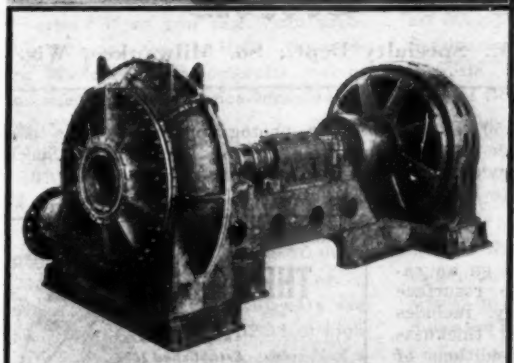

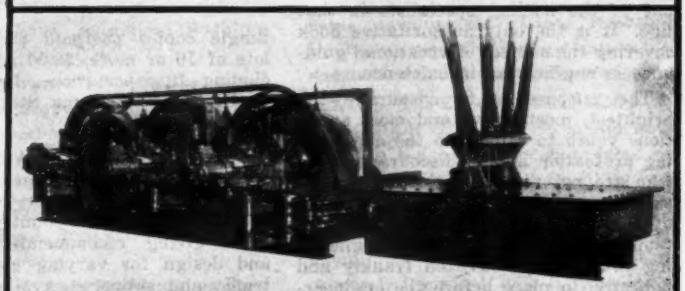

Bucyrus-Erie Company
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BUCYRUS ERIE

BUCYRUS-ERIE DREDGES

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Shots From the Firing Line—
Continued

was $144,898, which included 149,000 yards of common excavation for 44,700; 93,000 yards of rock for $83,700; and 5,620,000 station yards of overhaul for $5,620.

S. H. Newell & Company, Portland, were low bidders on Schedule No. 3, necessary grading for streets in the government campsite, with a quotation of $8,580 as follows: 37,400 yards of common excavation for $7,480; 1000 yards of rock for $700; and 40,000 station yards of overhaul for $400.

Bids will be opened May 17th for construction of 35 miles of railroad from Odair to the damsite, to be completed in 180 days.

Book Reviews

Caterpillar Tractor Company, Peoria, Illinois has recently published a 48-page catalog on a "70" tractor. This catalog is published in two colors, is profusely illustrated and contains complete specifications and illustration and descriptions of special equipment, which may be obtained for the "70". For a copy of this booklet, which will be supplied free upon request, please write Caterpillar Tractor Company mentioning **Excavating Engineer.**

Portland Cement Association of 33 West Grand Avenue, Chicago, Illinois, have recently issued an excellently prepared and well illustrated booklet describing Monolithic concrete sewers with photographs and drawings of design details of the construction used in eleven leading cities. Copies will be furnished on request.

Vocational Guidance in Engineering Lines . . . sponsored by the American Association of Engineers and edited by Dr. J. A. L. Waddell, assisted by Frank W. Skinner, Harold E. Wessman and others. There are sixty chapters, each one dealing with some special branch of engineering and written by one of the leading specialists in that line. It is the only authoritative book covering the subject of vocational guidance in engineering in existence.

The purpose is to encourage the brightest, most active and most ambitious youth to come into the engineering profession and to discourage those who are not fitted. Of very great interest to engineers, also to students of engineering and to those who contemplate entering a college engineering course. It is written frankly and honestly, to place before the engineering student the disadvantages of the profession, as well as its attractions and advantages.

Vocational Guidance in Engineering Lines is published by the Mack Printing Company, Easton, Pennsylvania. Single copies postpaid $2.50, and in lots of 10 or more, $2.00 per copy, including transportation. **Reviewed by R. D. Rader, Montana State Highway Engineer, Helena.**

Pavement Resurfaced With Concrete is a 20-page booklet based on an extensive survey of concrete resurface projects all over the country. Includes table giving recommended thickness and design for varying conditions of traffic and support. Available on request to **Portland Cement Association**, 33 West Grand Avenue, Chicago, Ill.

A 48-page, 8½x11, illustrated catalog on the **Caterpillar Diesel Seventy-Five Tractor** was recently published by Caterpillar Tractor Co., Peoria, Illinois. Action photographs as well as parts pictures are used throughout. Specifications are also included.

This remarkable unit is offered in five sizes, 2½, 5, 10, 15 or 20 ton.

A better way to handle rock

For loading or placing rip rap, or handling oversize with a crane, the Bucyrus-Erie Rock Grab saves time and cuts costs. It lifts by compression --- eliminates the necessity for previous preparation --- there are no slings or chains to handle. This new grab takes hold firmly and carries the load safely to its destination where it is released easily by the operator. If you are handling rock with a crane, find out about the savings the Rock Grab can make on your job. Ask for bulletin.

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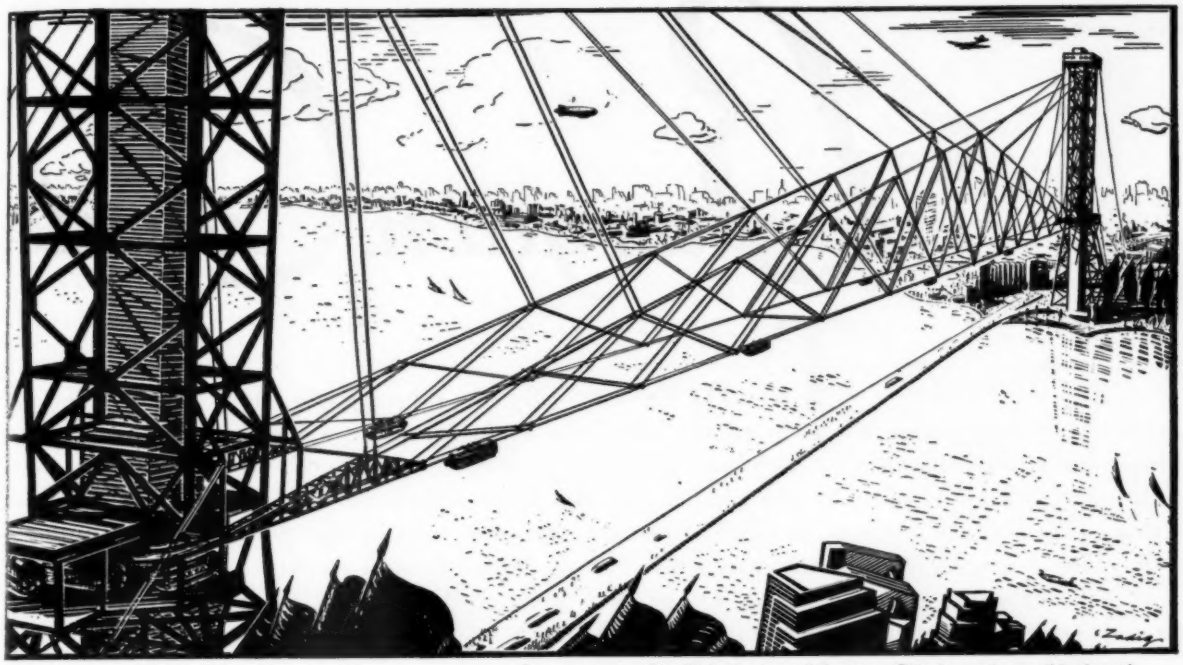

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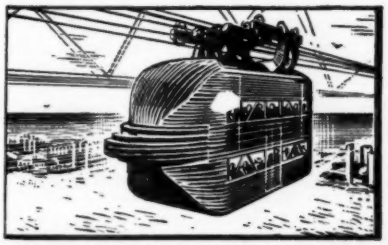
1½ MILLION PEOPLE
CARRIED SURELY AND SAFELY

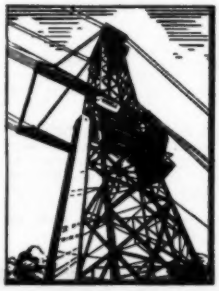
...on the Sky Ride, spectacular Century of Progress feature—suspension system designed and installed by ROEBLING...



One of 10 Sky Ride rocket cars designed by Roebling in collaboration with the Goodyear-Zeppelin Corp.

Did you go to Chicago's Century of Progress? If so, you saw...and probably rode on...the Sky Ride...the modern World's Fair spectacular feature and successor to the once-conspicuous Ferris Wheel.

1½ million people in five months of 1933 were carried surely and safely on the Roebling Cable Suspension System... on cars which traveled a total of 50 to 60 thousand miles.



One of the 628 foot Sky Ride towers, each having four Otis Elevators equipped with Roebling Wire Rope.

Towers are 628 feet high ... over ⅓ of a mile apart... and their Otis Elevators are equipped with Roebling Wire Rope. Span, between towers, is second longest in world. 10 Roebling "rocket" cars—each of 36 passenger capacity—travel 200 feet above ground on Roebling "Sky Ride Track Cable."

Roebling was selected to design and install the Suspension System of the Sky Ride because of its vast experience and the unquestioned dependability of its bridge cables and wire rope. It designed this system in collaboration with Robinson and Steinman, well-known bridge engineers.

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For your convenience in writing to John A. Roebling's Sons Co., you will find a card bound in this issue.

EXCAVATING ENGINEER Bargain Counter

★ ★ ★ THE ITEMS LISTED on these pages have been selected because they offer unusual values to the man who is looking for a bargain. Some of this equipment is surplus stock which has never been used, some is rebuilt and carries new equipment guarantee, some is just plain used. But every item is priced for quick sale. If any of this equipment fits your needs send a postcard or letter, mentioning the reference number, to *Bargain Counter, Excavating Engineer, South Milwaukee, Wisconsin.* We'll pass your inquiry along to the owner and you will receive price and complete information promptly. Act now — with advancing prices on new stock this equipment will move fast.

SHOVELS-CRANES DRAGLINES

P&H MODEL 208—45' BOOM DRAGLINE Cats—15½' long, 9' wide, 22" Treads. 100 HP. Waukesha High Alt. Engine. SCD-1.

AMERICAN 1 CU. YD. GASOLINE SHOVEL. Motor overhauled 1932. Good value. SCD-3.

P&H MODEL 208—45' BOOM DRAGLINE— 4-cylinder 7¾"x9" Twin City gasoline engine and 1½ cu. yd. Omaha bucket. SCD-20

BUCYRUS-ERIE 30-B DIESEL 40' BOOM DRAGLINE. SCD-21

MONIGHAN MODEL 1-W WALKER—60' Boom Dragline, 1¼ cu. yd. Page Bucket. Good condition. SCD-13.

OSGOOD 1½ CU. YD. STEAM SHOVEL CAT. MOUNTED. Good operating condition. SCD-22

BUCYRUS-ERIE MODEL 30-B DIESEL SHOVEL—25'9" Boom, 14' Dipper Handle, 1 yd. Dipper. SCD-9.

KOEHRING MODEL 1—30' Boom Gasoline Crane. Cat Mounted—No Bucket—4½"x5" Wisconsin Engine. SCD-19

BUCYRUS-ERIE SLIGHTLY USED-LOAD-MASTER TRACTOR CRANE—14' Boom—Rubber tired wheels—Rated lifting capacity 4500 lbs. McCormick-Deering Power Unit—New Machine Guarantee. SCD-17

Shovel Equipment

¾ CU. YD. DIPPER—20' boom—13' Dipper Handle—rope crowd shovel equipment. Suitable for models 1030 or 1035—brand new. SE-1

¾ CU. YD. DIPPER—23' BOOM—15' DIPPER HANDLE—Extra High Lift Rope Crowd Shovel Equipment suitable for Models 1030 or 1035. Brand New. SE-2.

¾ CU. YD. DIPPER—23' BOOM and ENGINE —12'6" DIPPER HANDLE—Shovel Equipment suitable for 20-B Steam. Brand New. SE-15.

COMPLETE FRONT END EQUIPMENT

¾ CU. YD. DIPPER—26' BOOM and ENGINE —17' DIPPER HANDLE—High Lift Shovel Equipment suitable for 30-B Steam. Brand New. SE-16.

¾ CU. YD. DIPPER—25'9" BOOM—14' DIPPER HANDLE—Shovel Equipment suitable for 30-B Diesel. Brand New. SE-17.

⅞ CU. YD. DIPPER—21'9" BOOM and ENGINE—15' DIPPER HANDLE — High Lift Shovel Equipment. Suitable for 31-B Steam. Brand New. SE-18.

1 CU. YD. DIPPER—20' BOOM—15' DIPPER HANDLE — Rope Crowd Shovel Equipment, suitable for Osgood "Conqueror." Good mechanical condition. Low Price. SE-24

1 CU. YD. DIPPER—26' BOOM—15' Dipper Handle—Rope crowd shovel equipment. Suitable for D-2 machine. Brand new. SE-3

1 CU. YD. DIPPER—23' BOOM—12'6" Dipper Handle—Rope crowd shovel equipment. Suitable for D-2 machine. Brand new. SE-4

1 CU. YD. DIPPER—24' BOOM—18' DIPPER HANDLE—Slightly used but good conditioned. Suitable for any Bucyrus-Erie GA-2 or GA-3 Machine. SE-25.

1 CU. YD. DIPPER—24' BOOM—16' DIPPER HANDLE—Rebuilt and Guaranteed. Suitable for application Bucyrus-Erie GA2 or GA3 Machines. SE-26

1¼ CU. YD. DIPPER—22'6" BOOM—16' DIPPER HANDLE—Rebuilt and Guaranteed. Suitable for application Bucyrus-Erie GA2 or GA3 Machines. SE-27

1¼ CU. YD. DIPPER—25' BOOM—17' DIPPER HANDLE—Slightly Used Rope Crowd High Lift Shovel Equipment suitable for Model 37-B. New Machine Guarantee. SE-5.

1½ CU. YD. DIPPER—23'6" BOOM—15' DIPPER HANDLE—Slightly Used Rope Crowd Shovel Equipment suitable for Model 37-B. New Machine Guarantee. SE-6.

1½ CU. YD. DIPPER—27' BOOM—17' DIPPER HANDLE—High Lift Rope Crowd Shovel Equipment suitable only for Bucyrus-Erie 43-B machines. Rebuilt—New Machine Guarantee. SE-23.

1½ CU. YD. VANDERHOEF FRONT DIPPER —21' Boom—15' Dipper Handle—Steam shovel equipment complete—Suitable for 41-B or 42-B. Rebuilt—New Machine Guarantee. SE-28.

Dragline Equipment

35' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For use on Model D-2. DL-2.

40' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For use on Model D-2. DL-3.

40' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For Model E-2. Brand New. DL-6.

45' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For Model E-2. Brand New. DL-7.

40' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For Model 30-B Diesel. Brand New. DL-8.

45' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For Model 30-B Diesel. Brand New. DL-9.

BRAND NEW Ropes included with each of above Dragline Equipments.

All of above equipment is BRAND NEW and of BUCYRUS-ERIE manufacture.

Trench Digging Equipment

¾ CU. YD—36" WIDE SOLID TYPE DIPPER, 21' Boom, and all auxiliary equipment for application to Model 1030. Will dig to maximum depth of 18'. Rebuilt—New Machine Guarantee. DS-3

1 CU. YD. 42½" WIDE—Solid type Dipper—24' Boom and all auxiliary equipment. Will dig maximum depth 22'. For application to GA-2 or GA-3 Shovel. Rebuilt—New Machine Guarantee. DS-5

BRAND NEW PAGE, two dippers each ¾ cu. yd., one 38" wide over cutters, the other 49½" wide over cutters. 17'1½" Boom and all necessary auxiliary equipment. Will fit Bucyrus-Erie 1030 or 1035. DS-7.

1-CU. YD. 42½" WIDE SOLID TYPE DIPPER —24' Boom and all auxiliary equipment—will dig maximum depth of 22'—For application to GA-2 or GA-3 Clam Shell or Drag Line. Rebuilt —New Machine Guarantee. DS-8.

BRAND NEW Ropes included with each of above Trench Digging Equipments.

Address all inquiries to Bargain Counter, Excavating Engineer, South Milwaukee, Wisconsin.

DIPPERS

Small Machines

2 ⅜ CU. YD.—Plate.—Will fit 20-B Steam or Gas. Brand New. D-12

1 2/3 CU. YD.—Plate front.—Will fit 14-B. Brand New. D-13

1 ¾ CU. YD.—Rock Type.—Will fit 20-B Steam or Gas. Brand New. D-15

3 ¾ CU. YD.—Plate front.—Will fit 1030 or 1035. Brand New. D-16

2 ¾ CU. YD.—Cast Front Inserted Tooth. Will fit 1030 or 1035. Brand New. D-17

2 ⅞ CU. YD.—Plate front.—Will fit 1030 or 1035. Brand New. D-18

1 ⅞ CU. YD. CAST FRONT INSERTED TOOTH DIPPER. Will fit 1030 or 1035. Slightly used. D-36

1 ⅞ CU. YD. CAST FRONT INSERTED TOOTH DIPPER. Will fit 1030 or 1035. Brand new. D-37

1 ⅞ CU. YD. Cast Front Inserted Tooth. Will fit B—B-2—B-3 and GA-2. D-19

1 ⅞ CU. YD.—Plate Front. Will fit 18-B. Brand New. D-20

1 ⅞ CU. YD.—Rock type. Will fit 31-B. Brand New. D-21

2 1 CU. YD.—Cast Front Inserted Tooth Dippers. Rebuilt and Guaranteed. Suitable for application GA2 or GA3 Machines. D-34

1 1¼ CU. YD.—VAN PORT—ROCK TYPE. Will fit E-2, 41-B or 42-B. Slightly Used. D-26

2 1¼ CU. YD.—VAN PORT—ROCK TYPE. Will fit E-2. Brand New. D-27

1 1¼ CU. YD. CAST FRONT INSERTED TOOTH DIPPER. Will fit 37-B. Slightly used. D-38

1 1½ CU. YD.—PLATE. Will fit E-2. Brand New. D-28.

1 1½ CU. YD. CAST FRONT INSERTED TOOTH DIPPER. Will fit 43-B. Slightly used. D-39

2 1½ CU. YD.—Manganese Front Inserted Tooth. Will fit E-2, 41-B or 42-B. Slightly Used. D-29

1 1½ CU. YD.—Vanderhoef type with Vanderhoef teeth. Will fit E-2 or 42-B. Slightly Used. D-30

Large Machines

1 2½ CU. YD.—Front 2½" Molybdenum Cast Steel, two part Van Port Reversible Teeth. Can be used on 68-C and 70-C machines. Brand New. D-1.

2 3 CU. YD.—Front 2½" Molybdenum Cast Steel, two part Van Port Reversible Teeth. Can be used on Model 100-B, 68-C, 70-C Machines. Brand New. D-2.

1 3½ CU. YD.—Front 2¾" Nickel Chrome Steel, two part Van Port Reversible Teeth. Can be used on Model 88-C, 95-C, Class 180. Brand New. D-3.

1 4 CU. YD.—Front 2¾" Molybdenum Cast Steel, two part Van Port Reversible Teeth. Has seen some service but in good condition. Can be used on Model 100-C, 120-B. D-4.

1 4½ CU. YD.—Lip 2¼" Manganese Steel, two part Reversible Manganese Teeth. Can be used on Model 88-C, 110-C. Brand New. D-5.

3 6 CU. YD. Molybdenum Steel Front, Annealed Cast Steel Back, two part Reversible Van Port Teeth. Can be used on 225-B and 320-B. Brand New. D-11.

1 8 CU. YD.—Front Molybdenum Steel, two part Van Port Reversible Teeth. Can be used on Model 320-B. Slightly Used but excellent condition. D-6.

DRAGLINE BUCKETS

BRAND NEW

2 ¾ CU. YD. PAGE CLASS "C." Approximate weight each 2425 lbs. DB-1

1 1½ CU. YD. PAGE CLASS "C." Approximate weight 4540 lbs. DB-3

3 2 CU. YD. PAGE CLASS "C." Approximate weight each 5630 lbs. DB-4

1 2 CU. YD. OMAHA STANDARD. Approximate weight 4300 lbs. DB-5

REBUILT

1 1¾ CU. YD. OMAHA STANDARD. Approximate weight 3800 lbs. DB-7

1 2 CU. YD. BUCYRUS-ERIE TYPE "U" RED ARCH. Approximate weight 3700 lbs. DB-8

1 2½ CU. YD. BUCYRUS-ERIE INSERTED TOOTH. Approximate weight 6500 lbs. DB-9

1 2½ CU. YD. OMAHA STANDARD. Approximate weight 5400 lbs. DB-10

BOILERS

BRAND NEW

Will Make That Old Shovel Work Like New.
Can Also Be Used for Miscellaneous Service.

Vertical Type

3 42"x88"—35 H.P.—144 lb. Working Pressure. Mass. Std. Will fit Type B Shovel. B-2.

1 44½"x88½" fitted with extended fire box for burning wood. Can be used for coal or coke. 37 H.P.—144 lb. Working Pressure. ASME Std. Can be installed on Type B Shovel. B-3.

1 44½"x88½"—37 H.P.—145 lb. Working Pressure—Canadian Standard. Will fit B or B-2. B-4.

1 46½"x88½"—37 H.P. 150 lb. Working Pressure. Canadian Standard. Will fit any B-2 or B-3 Machine. B-7.

3 46½x110"—40 H.P.—155 lb. Working Pressure. Special Wood Burning Fire Box. ASME Std. Will fit any B-2 or B-3. B-9.

1 54"x100"—41 H.P.—125 lb. Working Pressure. ASME Std. Will fit B-2 or B-3. B-11.

1 58"x7'9'—70 H.P.—150 lb. Working Pressure. Mass. Std. Will fit 42-B Machine. B-12.

Locomotive Type

3 44"x17'—75 H.P.—125 lb. Working Pressure. ASME Std. Will fit Model 68-C. B-13.

1 44"x18'—88 H.P.—125 lb. Working Pressure. ASME Std. Will fit Model 70-C. B-14.

1 54"x9'7"—70 H.P.—125 lb. working pressure —ASME and Canadian standard. Will fit Model 50-B machine. B-15.

2 54"x11'3"—92 H.P.—125 lb. Working Pressure. ASME and Mass. Std. Will fit Model 50-B Machine. B-16.

ELECTRICAL EQUIPMENT

MOTOR—GENERAL ELECTRIC—3 phase, 25 cycle, 550 volt, 1500 RPM., 90 HP., BRAND NEW. EE-1.

50 KW MOTOR GENERATOR SET—GENERAL ELECTRIC—consisting of 3 phase, 60 cycle, 440 volt, 1170 RPM., 75 HP., Induction Motor connected to 50 KW, 250 volt, 1200 RPM., Generator, including suitable rheostat and compensator. BRAND NEW. EE-2.

COMPENSATOR—GENERAL ELECTRIC—75 HP., 2200 volt, 3 phase, 25 cycle, manual type. BRAND NEW. EE-3.

TRANSFORMER—GENERAL ELECTRIC — 5-KVA. 2200-3810 volt primary, 440-220 volt secondary—3 phase, 60 cycle, with cast iron tank and cover, including specially fastened bushings to prevent oil leakage. BRAND NEW. EE-4.

GENERATOR — WESTINGHOUSE — 125 KW, 250 volts, 500 amperes. Direct Current. 440 RPM. Includes two outboard bearings. BRAND NEW. EE-5.

MOTORS (2) — GENERAL ELECTRIC — 21.5 H.P. 3 phase, 60 cycle, 440 volt, 900 RPM. Totally enclosed—ball bearing. BRAND NEW. EE-6.

AIR COMPRESSORS

1 BRAND NEW WORTHINGTON—METAL-WELD—2-cylinder 7"x6" Vertical 162 cu. ft piston displacement, Air Compressor. Fitted with Laidlaw feather valves—Lugs on side for mounting on skids or channels—Shaft extended and equipped with semi-flexible coupling to take 2⅝" drive shaft—Force feed lubrication. Automatic control. Includes 1" High capacity centrifugal circulating pump—"V" belt driven—18"x41" Air Receiver, 100 pounds working pressure, A.S.M.E. Standard. Electric or gasoline power required approximately 30 H.P., approximately 1000 R.P.M.—Compressor Speed approximately 550 R.P.M. — Overall dimensions: — Height 45"—Length 37½"—width 28". AC-3.

2 11"x11"x12" STEAM DRIVEN LOCOMOTIVE TYPE, Westinghouse air compressors with fittings. Brand New. AC-1.

1 11"x11"x12" STEAM DRIVEN LOCOMOTIVE TYPE, Westinghouse air compressor with fittings. Used. Make offer. AC-2.

ENGINES

Designed especially for application to Excavating or similar Equipment. Can be used for stationary or semi-stationary service.

Diesel

1 BRAND NEW NON-REVERSIBLE ATLAS DIESEL ENGINE—4-cylinder, 1" bore x 8½" stroke, 75 HP at 600 RPM, 4 cycle, vertical—valve-in-head type. Includes radiator, fan and air cleaners. DE-1.

2 BRAND NEW NON-REVERSIBLE ATLAS DIESEL ENGINES—5-cylinder, 9" bore x 10½" stroke, 150 HP at 450 RPM, 4 cycle, Vertical—valve in head type. Dust proof, Oil tight crank case and forced lubricating system. Also auxiliary air starting equipment. DE-2.

4 BRAND NEW NON-REVERSIBLE ATLAS DIESEL ENGINES—3-cylinder 6" bore x 8" stroke, 45 H.P. at 650 R.P.M., 4 cycle, Vertical—valve-in-head type. DE-5.

3 BRAND NEW NON-REVERSIBLE ATLAS DIESEL ENGINES—4-cylinder, 6" bore x 8" stroke, 60 HP. at 650 RPM. DE-6.

Steam

1 12½"x16" link reversing type for Railroad Shovel. ME-1.

2 4½"x5" reversible—20.8 HP at 400 RPM. 100 lb. Pressure. ME-2.

1 4¾"x5" reversible—23.2 HP at 400 RPM. 100 lb. Pressure. ME-3.

2 5"x5" reversible —25.6 HP at 400 RPM. 100 lb. Pressure. ME-4.

1 "LITTLE TUGGER" INGERSOLL RAND STEAM HOIST ENGINE No. 1-H-5-2½ H.P. ME-5.

PUMPS

1 NB—3 STAGE CENTRIFUGAL PUMP—2" suction and discharge — bronze impeller and shaft—capacity 100 gallons per minute at 240' head operating at 1720 RPM or 270' head at 1780 RPM. Now equipped for belt drive but can be operated by 15 HP Electric Motor. ME-6.

SOLID RUBBER TIRES

FOUR—40"x8" "HOOD" solid rubber heavy duty—Used for demonstration only—Good as new—Price very reasonable. RT-1.

Equipment You Ought to Know About

(Continued from Page 231)

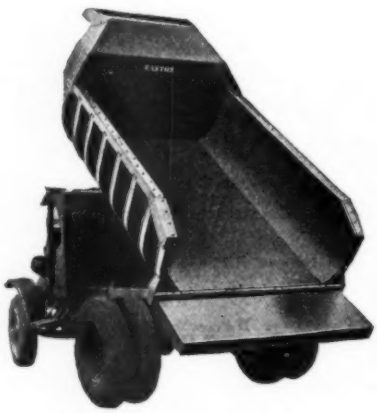
or with a tare beam. All beams are enclosed in one box equipped with a vertical sliding door and hasp for padlock. Each weigh beam has a beam lifter operated from outside the box. The box is weather proof and can be let closed and locked during operations. Beams and weights are brass with rust proof graduations. Scale levers are all steel. Graduations are to 500 pounds in 2-pound divisions. The platform is 30 inches wide by 42 inches long and only 3¼ inches from the ground. This "Little Titan" scale is manufactured by the *C. S. Johnson Company* of Champaign, Illinois. If you are interested write them.

Easton Announces Two New Dump Bodies

TWO NEW TRUCK BODIES designed for contractors for service in earth and rock excavations have recently been announced by *Easton Car & Construction Company, Easton, Pennsylvania.* These two bodies, known as models OE and GE have six and seven cubic yards capacity respectively. Heaped, they will hold eight and nine cubic yards, so the manufacturer claims.

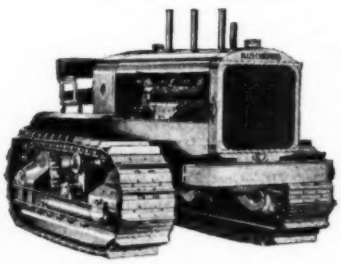
Model OE has no tail gate and may be preferred where shelf-rock can be loaded only by sliding it into the body. Model GE has an automatic opening and closing tail gate, which becomes flush with the bottom when the latter is elevated 17° and thereafter remains flush (see cut).

In designing these two bodies, the manufacturer has endeavored to make them exactly suitable for service on such operations as excavating, stripping and other



construction work. Body sills are made of heavy section H beams extending the full length. Body cradles are one piece machine forged heavy section H beams. Body end plate is heavily braced and extends upward and outward to form a secure protection for the cab and driver. Body plates are rounded with a large 15" radius at the junction of the sides with the bottom to insure the free egress of any sticky material. The floor is sandwich type, made by covering the bottom plate with 2" oak, and covering this in turn with a 5/16" high carbon steel plate. For complete specifications write Easton Car and Construction Company, Easton, Pennsylvania, mentioning *Excavating Engineer.*

New A-C Oil Tractors



TWO NEW oil engine tractors, models "KO" and "LO," have recently been announced by *Allis-Chalmers Manufacturing Company, Milwaukee, Wisconsin.* The application of this new oil engine follows, so the manufacturer claims, 10 years of intensive study of engines that burn cheaper grades of distillate fuel oil and the manufacturer states that it will do more work at less cost than any other trac-

(Continued on the next page)

POSITIONS WANTED

Positions wanted advertisements will be run under this heading for 5 cents per word, minimum charge $1.00. Advertisements for help wanted free of charge.

Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin

POSITION WANTED

College civil engineering student living in Milwaukee, Wisconsin, desires practical summer work with small pay on some small job such as shovel oiler, waterboy, flagman, rodman, or stakeboy for surveying, timekeeper, clerk, etc.; preferably somewhere in Wisconsin. Two years' experience in surveying at college. Can furnish references. Box 6600.

WANTED OWNER-OPERATOR

Wanted steam shovel operator with shovel for working gold placer in the South on profit sharing basis. Box 6601.

EXPERT DRAGLINE AND SHOVEL OPERATOR

16 years' experience as shovel operator. Married, 36 years of age. Have operated practically all makes of machines, and have 10 years' experience as dragline operator. Can handle steam, Diesel, electric or gasoline machine. Have worked on highway and railroad grading, rock excavation in quarry, drainage and irrigation and dredging and also gold dredging. Prefer position on Bucyrus-Erie E-2, D-2, or 50-B or other Bucyrus-Erie machines. Have also operated Class 220 and 225 electric and Diesel electric machines. Capable of taking charge of repairing and erecting and can handle crews. Best of references and can do own repairing. At present located in California, but will go anywhere. Box 5507.

ENGINEER-SUPERINTENDENT WANTS CONNECTION WITH CONTRACTOR

Twenty years' exceptional experience in factory construction, rock work, roads, dams, tunnels, hydro-electric developments, foundations. Has produced results under difficult conditions and can handle large program in whole or part. Eight years Latin America. Go anywhere. Box 5102.

SUPERINTENDENT

20 years operating and in charge of heavy strip mine and quarry equipment. 45 years of age. Can furnish references from any former employer and the largest manufacturer of excavating equipment in America. Can take full charge on reasonable notice. Box 5901.

OPERATOR-QUARRY FOREMAN

Have 25 years experience operating steam, electric and gasoline shovels and draglines on all classes of work. Can do own repair work. Also experienced quarry foreman with very best references. Married but willing to go anywhere. Present location Kentucky. Box 6200.

EXPERIENCED DRAGLINE OPERATOR

Fifteen years' experience on Bucyrus-Monighan, P&H, Northwest and other makes of Steam, Diesel, gas and electric draglines on levee work and phosphate mines. Hold three sets civil service papers with ratings of 70%, 85%, and 100%. Married but can go anywhere. Furnish excellent references. Present location, Louisiana. Box 5903

OPERATOR

Thirty years experience on coal stripping, railroad and highway construction. Prefer coal stripping anywhere. Can do own repair work and furnish best of references. Married. Present location, Pennsylvania. Box 6501.

SHOVEL OPERATOR

14 years' experience on railroad, highway and coal stripping. Prefer big coal stripper. Can do own erecting and repairing. Willing to go anywhere on short notice. Can furnish best of references. Present location Alabama. Box 6300

STRIPPING CONTRACTOR WANTED

For coal stripping project, 4½ to 7 feet of coal, 18 feet overburden, 20% slope in favor of the waste. Shovel or dragline should have at least 30 feet of Boom. Write A. E. Anderson, Steamboat Springs, Colorado.

DRAGLINE OPERATOR

13 years' experience operating steam, gasoline and Diesel draglines and clamshells on levee and drainage projects. Can do own repair work and furnish A-1 references. Single and willing to go anywhere. Present location Iowa. Box 6302

GAS OR STEAM SHOVEL OPERATOR

7 years' experience on cutting slopes, gradings and highway construction, not afraid of work. Would like a position on any type of small machine anywhere in the U.S.A. Can do his own repair work and furnish good references. Box 6599.

tor engine. Any grade of commercial Diesel fuel that is within the limits of viscosity, free from sulphur, and clean, can be used. Fuel oil from which the most efficiency will be obtained are commercial Diesel oils, grades 2 and 3. These new oil engines start by either hand cranking or electric starter. This is possible because of the low compression of the engine (125 pounds). No special starter or auxiliary engines are necessary.

Fuel oil is injected into the cylinders under pressure through the Bosch Diesel fuel pump and injectors. This fuel injection is positive and always controlled by the governor of the tractor. Ignition of the finely sprayed oil is from the ordinary spark plug and time tried magneto. Positive, simple and well understood by the average operator and mechanic.

The weights of the "LO" and "KO" are 23,000 pounds and 11,200 pounds, respectively, in keeping with the horsepowers of the tractors. The "LO" standard is equipped with front bumper, pull hook and 20" track shoes. You can expect and will receive the same dependable performance from the "LO" and the "KO" that you obtained from the gasoline models "L" and "K."

Further information will gladly be given by the manufacturer. Please mention *Excavating Engineer* when writing.

Old Times and Old Timers

(Continued from Page 227)

what prophet of that time would have dared to dream of the giant 20-yard stripping shovels of today. Another hundred years and the world will have new wonders quite as far beyond the possibilities of our wildest fancies.

Thanks to our English friends for this interesting contribution. Let us have more letters and pictures from our Old Timers overseas.

Yachtsman: "If this storm keeps up, I'll have to heave to."

Seasick Lady: "What a horrid way of putting it."

FOR SALE

RATES:	First insertion rate per column inch	Repeat insertions (no change in copy) rate per column inch
Up to 3 inches	$4.50	$4.00
Over 3 and up to 7 inches	4.25	3.75
Over 7 inches	4.00	3.50

Rates are net (no commissions, no discounts) and payable in advance of publication. Send your remittance with insertion order and copy.

Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin

Small Shovels
Under 2 Yards

BYERS BEARCAT, Model 27, gasoline ½-cubic-yard Skimmer scoop, crane-clamshell and drag shovel with front opening dipper. Engine—4-cylinder, 4"x5" Hercules Model OX. Machine new July 1928. Excellent condition. Box 293-SS.

Thew—Universal—Model 35—½ cu. yd. shovel. Center drive cat. Electric starter. 4 cylinder Waukesha 4½" x 6¼" gasoline engine. Also 25' clamshell—crane equipment, drag shovel equipment and skimmer scoop attachment available including home-made trailer. Box 468-SS.

MARION STEAM SHOVEL FOR SALE
Model 36; revolving; mounted on four railway wheels, 24-foot boom, 1½-cubic-yard dipper capacity; purchased new 1920; actual service about 3⅔ years; condition good. For price address Box 488-SS.

BUCYRUS ERIE So. Milwaukee, Wis.

OFFERS FOR SALE OR RENT
FACTORY REBUILT and USED SHOVELS--CRANES--DRAGLINES

Please send me full details on:

- ☐ Osgood 1½ yd. Steam Shovel — Bargain.
- ☐ Thew Model 35, ½ yd. Sh. Crane, S. Scoop & Trench Digger.
- ☐ Speeder ½ Yard Shovel. Good Condition.
- ☐ Bucyrus-Erie Model 1035—Chain Crowd Shovel. Rebuilt—Guaranteed.
- ☐ P&H Model 207—40' Boom Dragline. Reconditioned.
- ☐ Monighan Dragline 60-foot boom. Priced right.

Name .....

Address .....

20-B BUCYRUS-ERIE STEAM SHOVEL, serial number 4000; caterpillar mounted; 18-foot boom, 12-foot 6-inch dipper handle, 1-yard dipper; shipped new in 1923; located western Missouri. Bargain. Box 241-SS.

Marion Type 32 Steam Shovel, Shop No. 5676, 18' boom, 15' dipper handle, 1¼-cu. yd. dipper shipped May, 1926, good operating condition. Box 451-SS.

BUCYRUS-ERIE FIELD RECONDITIONED D-2 Diesel High Lift Shovel—26' Boom, 17' Dipper Handle, 1 cubic yard Dipper, Atlas four cylinder 6½"x8½" Engine. Excellent condition. Box 428-SS.

AMERICAN Gas Shovel—21' Boom, 15' Dipper Handle, 1 cubic yard Dipper, Waukesha four cylinder 6"x7" Engine. Bargain price. Box 429SS.

If You Do Not Find What You Want Listed—Write Us
Excavating Engineer
South Milwaukee, Wisconsin

MARION MODEL 32, shop No. 5459, mounted on "cats," steam-powered, 1¼-cubic-yard dipper, 24-foot boom, 17-foot 6-inch dipper handles. Box 82-SS.

BUCYRUS-ERIE TYPE "GA-2" GAS+AIR SHOVEL, shop number 4117, mounted on spur gear drive caterpillar trucks, and equipped with a 24-foot boom; 18-foot, 4-inch dipper handle; 1-cubic-yard manganese cast front socket inserted tooth dipper; power boom hoist; air self-starter, and all equipment and appurtenances in accordance with the specifications of Bucyrus-Erie Company, f.o.b. cars shipping point Virginia. Box 126-SS.

ONE 18-B BUCYRUS-ERIE, ⅞-yard dipper on full revolving caterpillars. Box 182-SS.

BUCYRUS-ERIE-GAS-AIR-SHOVEL—22' 6" Boom—16' Dipper Handle—1 cu. yd. Dipper—Single Shaft Cat. Located Canaan, N. Y. Good operating condition. Box 456 SS

NORTHWEST SHOVEL, model 105, caterpillar mounted, 24-foot boom, 1-cubic-yard dipper, 16-foot dipper handle. In good condition. Price $4,500, f. o. b. Utica, New York. Box 34-SS.

P&H MODEL 204. Shop number above 2200 combination Shovel Clamshell. 19' shovel boom, 14' 6" dipper handles, ½ cubic yard dipper, 35' clamshell boom, ½ cubic yard Owens Type M digger type bucket. Both front end equipments less than one year old. Excellent condition. Box 254-SS

SPEEDER—½ Cu. Yd. Gasoline Shovel. Model B-2—Good Condition—Located near Detroit. Price low. Box 487-SS.

Type "B" Shop No. 1594, Caterpillar mounted, equipped with 19'6" boom, 16' dipper stick and ¾ yard dipper, in good working order. Located near Hudson, Pennsylvania. Price $1750.00. Box 493-SS.

ONE TYPE "B" BUCYRUS-ERIE STEAM MACHINE, mounted on "cats", ¾-cubic-yard dipper, shop number 2301, 19-foot boom and 16-foot dipper handle. Box 83-SS.

BRAND NEW PAGE DRAG SHOVEL EQUIPMENT suitable for application to Bucyrus-Erie 1030, 1035, or 32-B machines now in the field, consisting of 17-foot 1½-inch boom, 11-foot dipper handle, and two ¾ cubic-yard dippers; one 38-inches wide over cutters—the other 49½-inches wide over cutters, together with auxiliary A frame and ropes. Priced below cost. Box 881-SS.

FOR SALE

Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin

Small Shovels
Under 2 Yards
Continued

BUCYRUS-ERIE—MODEL 1025—⅝ yd. Gasoline Shovel. Good condition. Located in California. Box 479-SS.

BYERS BEAR CAT—⅝ yd. Gasoline Shovel—Recently overhauled — Located Birmingham, Alabama. Box 480-SS.

P & H MODEL 600—1 yd.—Gasoline Shovel—Waukesha Engine. Recently overhauled. Located in Alabama. Box 483-SS.

BUCYRUS-ERIE—TYPE B-2—Combination 40' Boom—Clamshell machine and Blaw-Knox Bucket and Extra High Lift Steam Shovel equipment — Good condition — Located near Pittsburgh, Pa. Box 484-SS.

2 BUCYRUS-ERIE—GA-2—Combination—45' Boom Clamshell—Crane machine and Extra High Lift Shovel equipment. Cat mounted—Self starter—All field rebuilt last year—Excellent condition—Located Eastern Pa. Box 485-SS.

Drag Shovel

Thew—Universal—Model 35—½-cu. yd. drag shovel complete. Center drive cat. Electric starter. 4 cylinder Waukesha 4½" x 6¼" gasoline engine. Also complete ½-yd. shovel equipment and 25' boom clamshell—crane equipment and bucket together with home-made trailer. Box 468-SS.

BUCYRUS 35-B ELECTRIC FULL REVOLVING SHOVEL SHOP NO. 1989. 1½-cu. yd. capacity mounted on full belt caterpillar trucks having all steel trucks and manganese steel treads, 24'boom, 16' dipper handles. It has a 100 H.P. motor on hoist, 25 H.P. on swing and 35 H.P. on boom. Cutler-Hammer Automatic Panel Control on hoist and swing and Cutler-Hammer hand control on boom. The shovel operates on 440 volts 25 cycle, 3 phase. It formerly operated on 60 cycle but we changed the motors to 25 cycle to accommodate our current. It is in excellent condition and we have with it about $2,000.00 worth of new repair parts. Box 458-SS.

P&H MODEL 208—45' Boom Dragline—100 HP Waukesha Gas High Altitude Engine. Good operating condition. Box 432SS.

P&H MODEL 207—40' Boom Dragline—Buda Gas Engine. Field reconditioned. Box 433SS.

KOEHRING MODEL 1 Gas 30' Boom Crane—4½"x5" Wisconsin Engine. Box 435SS.

OSGOOD Steam Shovel—21'9" Boom, 16' Dipper Handle, 1½ cubic yard Dipper. Good operating condition. Box 436SS

BUCYRUS-ERIE 1030 GAS, ROPE CROWD SHOVEL. Good operating condition. Located eastern Minnesota. Available for demonstration. Price right for quick sale. Box No. 490-SS.

BUCYRUS-ERIE MODEL 1035—⅞ yard, Chain Crowd Shovel. Waukesha Model HL Engine. Electric Starter. 26" Cat. Treads. Factory rebuilt—New machine guarantee. Brand New Clamshell and Dragline equipment available. Box No. 491-SS.

BUCYRUS-ERIE MODEL 37-B—1½ cubic yard Chain Crowd Shovel. Electric Starter. Wisconsin 6-cylinder Gasoline Engine. Factory rebuilt—New machine guarantee. Box No. 492-SS.

BUCYRUS-ERIE 20-B steam shovel ¾-yard Dipper. $600.00. Chicago territory. Box 348-SS.

BUCYRUS-ERIE FIELD rebuilt, 1½ cu. yd. gasoline shovel. Electric starter, Wisconsin 6 cylinder engine. Kohler light plant, 40' dragline equipment and bucket and clamshell equipment available. Box 467-SS.

HEAVY DUTY OSGOOD SHOVEL, Shop No. between 1600 and 1700, located near Scranton, Pa., equipped with a 1½ cubic yard dipper, in good operating condition. Price $3000.00. Boiler inspected January 1st, 1934. Box 473-SS

BUCYRUS-ERIE TYPE B ERIE steam shovel ¾ yd. dipper, 19'9" boom, 16' dipper handle—cat mounted—power boom hoist. Boiler good condition. Machine can be demonstrated under steam. Located Detroit, Michigan. Excellent bargain. Inquire for price. Box 475-SS.

TYPE B-2 BUCYRUS-ERIE STEAM SHOVEL, number 9830, mounted on single shaft caterpillar type mounting. Equipped with 21-foot 3-inch boom, 16-foot dipper handle, ⅞-cubic-yard inserted tooth dipper. Boom hoist and Mass. standard boiler. Located vicinity of Boston. Reasonably priced. Box 345-SS.

Small Draglines
Under 2 Yards

BUCYRUS-ERIE D-2—Atlas Diesel—45' boom dragline and 1 cu. yd. Page bucket. Cat mounted. Good operating condition. Located near Lake Providence, Louisiana. Very attractive price. Box 450-SD.

BUCYRUS-ERIE D-2 DIESEL—40' Boom Dragline, used on light work about 6 months since rebuilding. Excellent condition. Located Central Ohio. Box 443-SD.

BUCYRUS-ERIE — REBUILT 45-B Gas — 65' Boom Dragline. LeRoi six cylinder 6½"x7" Gasoline Engine. 1½ KW Kohler Light Plant installed. New Machine Guarantee. Box 456-SD

BUCYRUS-ERIE FIELD rebuilt, 40' boom dragline. 1½-yd. capacity. Electric starter. Wisconsin 6 cylinder gasoline engine. Kohler light plant. Shovel equipment and clamshell equipment available. Box 467-SD.

P & H MODEL 700 DRAGLINE; number 2894 equipped with a 50 foot boom, light 1½-cubic-yard drag bucket, electric light plant, and powered with 4-cylinder Atlas Diesel engine. Box 189-SD.

P & H DRAGLINE MODEL 700; number 2456 equipped with a 50-foot boom, light 1½-cubic-yard drag bucket, electric light plant, and powered with a Waukesha gasoline engine. Box 190-SD.

BUCYRUS-ERIE — GA-2 — 40' Boom Dragline complete with Page Bucket. Spur gear Cat. Air Starter. Waukesha 5¾"x8"—4-cylinder Gas Engine. Recently overhauled. Excellent condition. Located Detroit. Box 486-SD.

MONIGHAN 60 FOOT BOOM DRAGLINE mounted on 1-W walking device—Waukesha 5¾x8, 4 cyl. gas engine, also 1¼ yd. Page bucket. Good operating condition. Box 408-SD

P & H Model 206 B Dragline. Good operating condition. Very favorably priced. Box 390-SD.

P&H MODEL 775—70' BOOM DRAGLINE including 1½ and 2 yard Omaha Buckets. Extra long Crawler. Excellent mechanical condition. No repairs needed. Located near Memphis. Box No. 489-SD.

If You Do Not Find What You Want Listed—Write Us

Excavating Engineer
South Milwaukee, Wisconsin

P&H MODEL 700 USED GASOLINE COMBINATION DRAGLINE SHOVEL, shop number 3007, 40-foot dragline boom plus 10-foot extension and 1½-cubic yard drag scraper bucket. 25-foot 10-inch shovel boom, 19-foot 3-inch handle and 1½-cubic-yard dipper. Waukesha Type WL 4 cylinder 6¼"x8" engine. Good condition. Some repair parts on hand. Machine located Tilleda, Wisconsin. Box 378-SD.

P&H MODEL 208—45' BOOM DRAGLINE— 7¾"x9" four cylinder Twin City Gas Engine, 1¼ cu. yd. Omaha Bucket included. Box 460-SD.

NORTHWEST—MODEL No. 4—50' boom dragline including drop ball for rock breaking. Cat mounted. 4 cylinder 6 x 7 Wisconsin gasoline engine. Excellent operating condition. Located vicinity New York. Box 470-SD.

MONIGHAN BRAND NEW—40' Boom Dragline. Cat Mounted, Waukesha four-cylinder 6½"x7" Gasoline Engine, 900 R.P.M., 93 H.P. Electric Starter, Steel Cab. Exceptional Value. Box 453 SD.

BUCYRUS-ERIE—65' BOOM—DRAGLINE AND 2 YD. OMAHA BUCKET. LeRoi six-cylinder 6½"x7" gasoline engine. 1½ KW Kohler Electric light plant installed. Factory rebuilt. New machine guarantee. Box 476-SD.

BUCYRUS-ERIE 30-B Diesel—40' Boom Dragline. Box 437SD.

Small Clamshells and Cranes
Under 2 Yards

4—BUCYRUS-ERIE—TYPE B—40' Boom—Clamshell machines—Cat mounted—Good condition. Located vicinity of Chicago. Box 381-SCC.

BUCYRUS-ERIE—SLIGHTLY USED LOADMASTER TRACTOR CRANE 14' BOOM— Rubber tired Wheels—Rated Lifting Capacity 4500 lbs. McCormick Deering Power Unit—New machine guarantee. Box 410-SCC.

McMYLER MODEL J. LOCOMOTIVE CRANE—35 Ton Steam. 50 and 75-ft. Boom. 1½ or 2-yd. buckets. New boiler and swinging engine recently installed. A real crane for long reach and heavy work. Thoroughly overhauled condition. $4,800.

Box 346-SCC.

BYERS BEARCAT CRANE with Back Hoe Attachment. (¾ swing). Good operating condition. Very attractively priced. Located vicinity of Wilkes Barre, Pennsylvania. Box 494-SCC.

CRANE—THEW—UNIVERSAL—MODEL 35— 25' boom clamshell—crane including ½ cu. yd. Williams clamshell bucket—center drive cat. Electric starter. 4 cylinder Waukesha 4½"x6¼" gasoline engine. Also, complete ½ yd. shovel equipment, drag shovel equipment and skimmer scoop equipment together with home-made trailer. Box 468-SCC.

NORTHWEST — MODEL 105 — 45' BOOM CRANE. Cat mounted. 1 yd. capacity. 6½x8 Twin City gasoline engine. Good operating condition. Located vicinity New York. Box 469-SCC.

BUCYRUS-ERIE FIELD rebuilt, 40' boom clamshell machine. 1½ yd. capacity. Electric starter. 6 cylinder Wisconsin gasoline engine. Kohler light plant. Shovel equipment and dragline equipment with bucket also available. Box 467-SCC.

THEW-UNIVERSAL 35 CRANE on center drive cats, 36' Boom, fairleads, ½ yd. dragline bucket, 3000 lb. hammer, leads and cap. Excellent condition, sale or rent. Located Western Ohio. Box 457 SCC.